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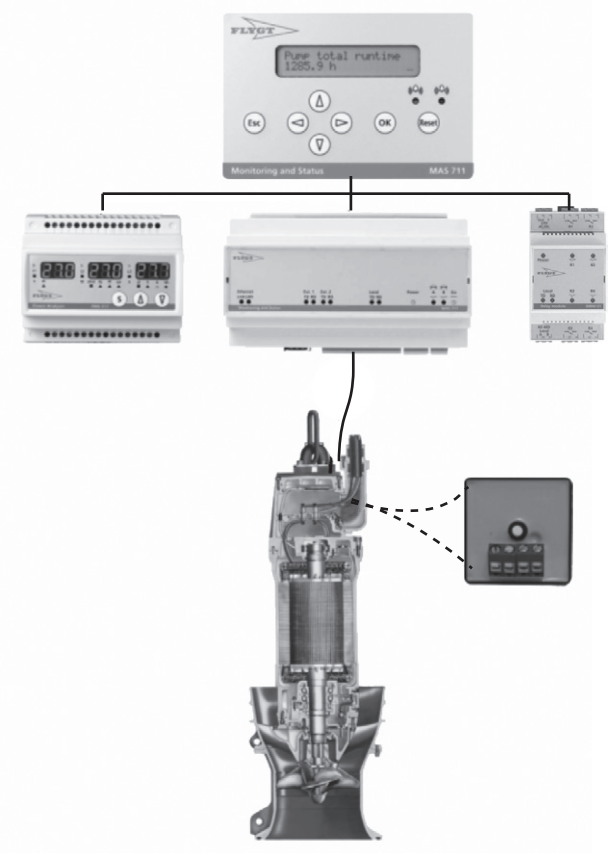
Installation and Operation

MAS 711



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Installation and Operation

MAS 711

Overview

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Preface

Purpose

The purpose of this manual is to give the reader an overview of how to install and set up the MAS 711.

Recipient

The manual is principally intended for Flygt

- service departments *and*
- customers.

Product Documentation

The policy of the Flygt documentation department is to develop as user friendly product information as possible. Please inform us if this manual

- lacks information that would make the operation of the product easier *or*
- contains information that is irrelevant to the operation of the product.

Abbreviations

This table shows some of the abbreviations that may be found in this manual:

Abbreviation	Meaning
APP	Automatic Pump Pilot. Pump controller.
CAS	Control And Status. Old pump monitoring system, replaced by MAS.
CLS	Capacitive Leakage Sensor. Detects the presence of water in the oil chamber.
FLS	Flygt Leakage Sensor. Float switch for detection of liquid.
FMC	Flygt Mactec Control. Pump controller.
MAS	Monitoring And Status. Pump monitoring system.
MRM 01	MAS Relay Module
PLC	Programmable Logic Controller. General purpose programmable controller.
VIS10	Vibration sensor

Reference

More information about the MAS 711 and how to handle it is available in the following documents:

- Technical specification, MAS 711 Monitoring system.
- MAS Base unit, Modbus protocol (rev 1,2,3).
- PAN 311/312 User manual.
- MRM 01, Installation and User Manual.

General Safety Information

Overview

NOTE!

It is extremely important that you read, understand and follow the warnings and safety regulations carefully before handling an Flygt product. They are published to help prevent

- personal accidents and health problems
- damage to the unit
- product malfunction.

Flygt assumes no liability for either bodily injuries, material damages or economic losses beyond what is stated in this chapter.

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Environment

The unit must be installed in an environment that is

- sheltered
- well-ventilated, *and*
- non-hazardous.

Temperature

The unit must be used at a temperature within the minimum and maximum rate defined in accompanying technical data.

Disturbance

Ensure that equipment causing serious disturbance is suppressed in the best possible way.

User Safety and Health

Introduction

All government regulations, local health and safety directives must be observed.

General electricity precautions

All danger due to electricity must be avoided. Electrical connections must always be carried out in compliance with the

- connections shown in the product documentation that is delivered together with the product, *and*
- electrical regulations locally in force. **Reference:** For details, consult the regulations of your local electricity supplier.

Ground the unit: Ground the unit before carrying out any other operation. The electric pump motor and the panel must be connected to an efficient grounding system in compliance with the electrical regulations locally in force.

Disconnect the power supply: Always disconnect the power supply before proceeding to carry out any operation on the electrical or mechanical components of the unit or the system. Isolate the power supply before opening the pump.

High Voltage!

Check rated data: Before starting the installation work, check that the rated data of the automatic control panel is suitable to the mains power supply and the rated data of the pump.

Isolate power supply before troubleshooting: All trouble shooting must be carried out with the power supply isolated. If not, the pump could start unexpectedly.

Warranty

Introduction

Flygt undertakes to remedy faults in products sold by Flygt if the fault is

- caused by defects in design, materials or workmanship, *and*
- reported to Flygt or Flygt's representative during the warranty period.

Limitations of validity: The warranty does not cover fault due to the following:

- Deficient maintenance
- Improper installation
- Improper use
- Incorrectly executed repairs
- Normal wear and tear

Qualification of personnel

All work on the product should be carried out by certified electricians or Flygt-authorized mechanics.

Flygt disclaims all responsibility for work done by untrained, unauthorized personnel.

Usage

The monitoring equipment incorporated in the product must be correctly connected and in use.

Improper use may cause damage to the equipment and result in warranty cancellation.

Modification

Modifications or changes to the product/installation should only be carried out after consulting with Flygt.

Spare parts

Original spare parts and accessories authorized by Flygt are essential for compliance. The use of other parts can invalidate any claims for warranty or compensation.

Warranty claim

For warranty claim, contact your Flygt representative.

Support

Flygt only supports products that have been tested and approved. Flygt will not support unapproved equipment.

Warning Symbols

Symbols

In the Flygt documentation, admonitions are used together with the denomination.

The following items describes the safety levels of the admonition symbols in combination with the denomination.

DANGER!

Risk of causing
- severe injury to people
- death, *or*
- considerable damage to property

if the warning is ignored.

WARNING!

Possible risk of causing
- severe injury to people
- death, *or*
- considerable damage to property

if the warning is ignored.

CAUTION!

Risk of causing
- injury to people, *or*
- damage to property

if the warning is ignored.

NOTE!

Information that is important for the proper operation of the product, but is not a risk to the safety of personnel.

Presence of a dangerous voltage.

Product Description

Overview

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This chapter contains the following topics:

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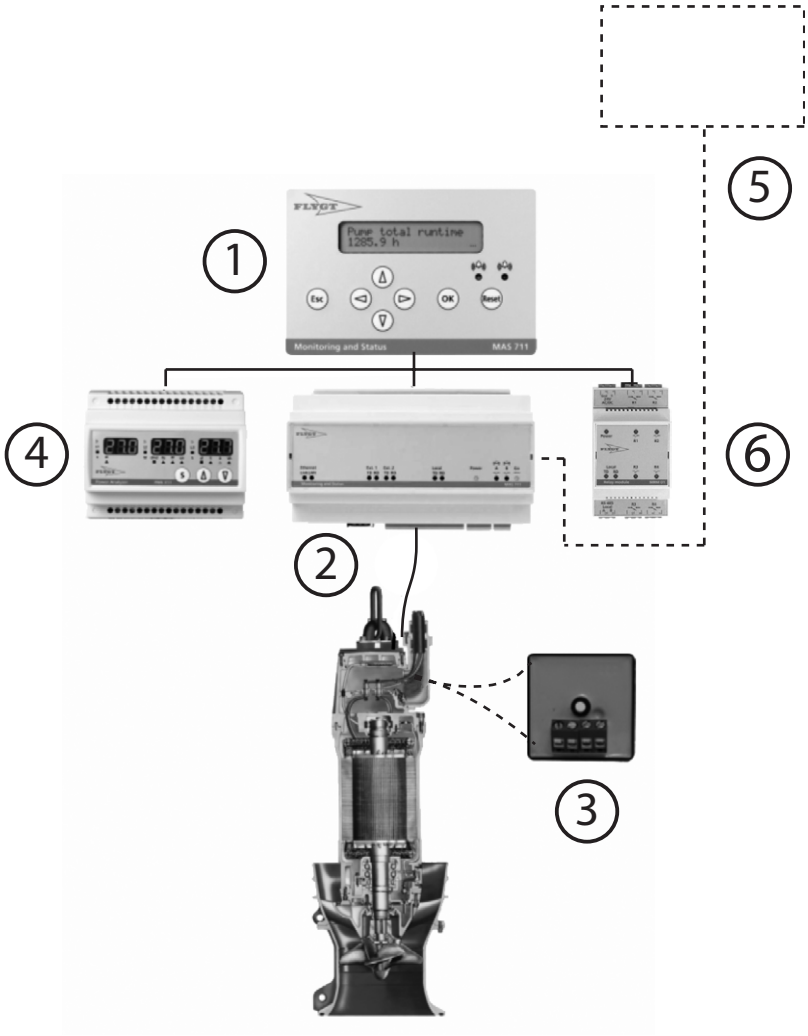
System Components

Illustration



Component Description

This table describes the system components:

Number	Component	Description
1	Operator panel	Front panel mounted module used for interaction with the system.
2	Base unit	Contains a powerful processor, memory and terminals for sensor connections.
3	Pump memory	Mounted inside the pump and contains information about the pump.
4	Power analyzer	Optional unit, which measures power, current, voltage and power factor.

Number	Component	Description
5	Higher level system	Possibility to connect to a higher level system (APP/FMC or PLC) using Modbus.
6	Relay Module	Optional output unit containing four relays. Enables communication for individual monitoring channel alarms (A and/or B alarms) to specific relays and LEDs on the relay module(s).

Pump Memory

The pump memory is an electronic unit mounted in the pump top, containing unique data about the particular pump it is fitted in. By keeping records in the pump, data cannot be lost or corrupted when the pump is serviced or moved. The information is used to simplify installation, service and maintenance of the pump and the monitoring system.

Memory contents

The pump memory contains the following information:

- Data plate information, a fixed part and an editable part
- Pump sensor configuration and settings
- Running statistics
- Service notes
- Service interval

Synchronization and backup

The base unit performs all measurements and data processing in the system. A subset of all data is also stored in the pump memory. Updated measurement results, parameters or text are first stored in the base unit and then copied to the pump memory. An automatic synchronization (update) of the pump memory with the latest information from the base unit takes place every second hour.

Power Analyzer

MAS 711 is pre-programmed for use with the optional Power analyzer PAN311/PAN312. See PAN 311/312 User manual for more information about setup and connection.

The Power analyzer measures:

- Voltage in three phases and system voltage (phase voltage requires connection “Three phase with neutral”)
- Current in three phases and system current
- Power in each phase and system power
- Power factor
- Energy consumption

Voltage and current unbalance are calculated by the base unit based on data from the instrument.

MAS will automatically read a selection of registers in the Power analyzer over the RS-485/Modbus serial data link Ext 2. In this way measured electrical quantities are recorded and presented on the operator panel and the web tool.

Higher Level System

This communication port is dedicated for communication with a higher level system, meaning for instance a Flygt APP/FMC pump controller or a PLC (Programmable Logical Controller). The base unit acts as a slave in such a network.

A separate document (MAS Base unit, Modbus protocol) defines in detail how to set up the communication with the base unit and contains registers used for reading parameters.

Relay Module

MAS relay module (MRM 01) is an optional part of the monitoring system. One or more relay modules (maximum number of 8 modules) can be connected to the base unit through RS-485 Modbus. This will enable MAS to communicate individual alarms on the separate monitoring channels (A and/or B alarms) to relays and LEDs on the relay module(s).

The pump sensors will be connected to the base unit and the base unit will monitor the pump and detect unhealthy conditions. The individual alarms will be transmitted to LEDs and relays on the MRM 01. The configuration of what alarm that will trigger which relay on which module is done through the web tool. Sensor configuration, alarm limits and additional settings are also done in the web tool. See MRM 01, Installation and User Manual for more information about setup and connection.

Ingress Protection

The base unit ingress protection is IP20, which means there is no protection against water. Therefore, it should be mounted inside an electrical cabinet. The operator panel front has an ingress protection of 65, which means it withstands a water splash or jet if mounted in a panel or a cabinet door. The back of the operator panel is IP20.

Configurations

Configuration Alternatives

The system provides two alternative configurations useful for different situations:

- the base unit factory default configuration (for retrofit of CAS) *or*
- a pump specific configuration brought by the pump memory.

Default Configuration for Retrofit of CAS

Since MAS might be used as sparepart for its predecessor CAS or for retrofit (upgrade), it is factory preset to fit as a CAS substitute. In this factory default configuration the following monitoring channels are enabled:

- Stator temperature monitoring by means of thermal switches.
- Leakage sensor in the stator housing.
- Leakage sensor in the junction box.
- Main bearing temperature monitoring by means of a Pt100 sensor.

Pump and Application Specific Configuration

The pump memory which is fitted at the factory, contains information which must be loaded into the base unit. This makes the system automatically configured to reflect the actual setup of sensors in the particular pump. Default parameters, suitable for the pump such as alarm limits are also transferred.

Application specific settings can be done either by using the operator panel or by connecting a computer to the base unit and using the web tool.

Monitoring Alternatives with Flygt Pumps

Large Pumps

Flygt standard monitoring (12-lead SubCab sensor cable)

Large pumps are equipped with a standard set of monitoring sensors to allow safe and reliable operation. This standard includes large pump models

- 3231
- 3306–3800
- 7061–7121.

This alternative requires 12-lead SubCab sensor cable and includes the following sensors:

- Thermal switches for stator temperature monitoring (3 in series) or PTC-thermistors.
- Leakage sensor in the stator housing.
- Leakage sensor in the junction box.
- Analog temperature sensor (Pt100) for main bearing temperature monitoring.
- Analog temperature sensor (Pt100) for stator winding temperature in one phase.
- Pump memory.

Optional monitoring (24-lead SubCab sensor cable)

Additional monitoring functions require the use of a 24-lead SubCab sensor cable. The following options are available:

- Vibration sensor VIS 10.
- Analog temperature sensor (Pt100) for stator winding temperature in phases 2 and 3.
- Leakage sensor in the oil housing (CLS).
- Analog temperature sensor (Pt100) for support bearing temperature monitoring.

Midrange Pumps

Optional monitoring, alternative 1 (12-lead SubCab sensor cable)

The following options are available with midrange pumps (3153, 3171, 3202 and 3301) and require the use of a 12-lead sensor cable:

- Thermal switches for stator temperature monitoring (3 in series) or PTC-thermistors.
- Leakage sensor in the inspection chamber.
- Leakage sensor in the junction box.
- Analog temperature sensor (Pt100) for main bearing temperature monitoring.
- Analog temperature sensor (Pt100) for stator winding temperature in one phase.
- Pump memory.

Optional monitoring, alternative 2 (12-lead SubCab sensor cable)

Alternative 2 is the same as alternative 1 above but the Leakage sensor in the junction box is replaced by a Vibration sensor (not available with 3153).

Optional monitoring (25-lead sensor cable)

The following additional monitoring functions require the use of a 25-lead sensor cable:

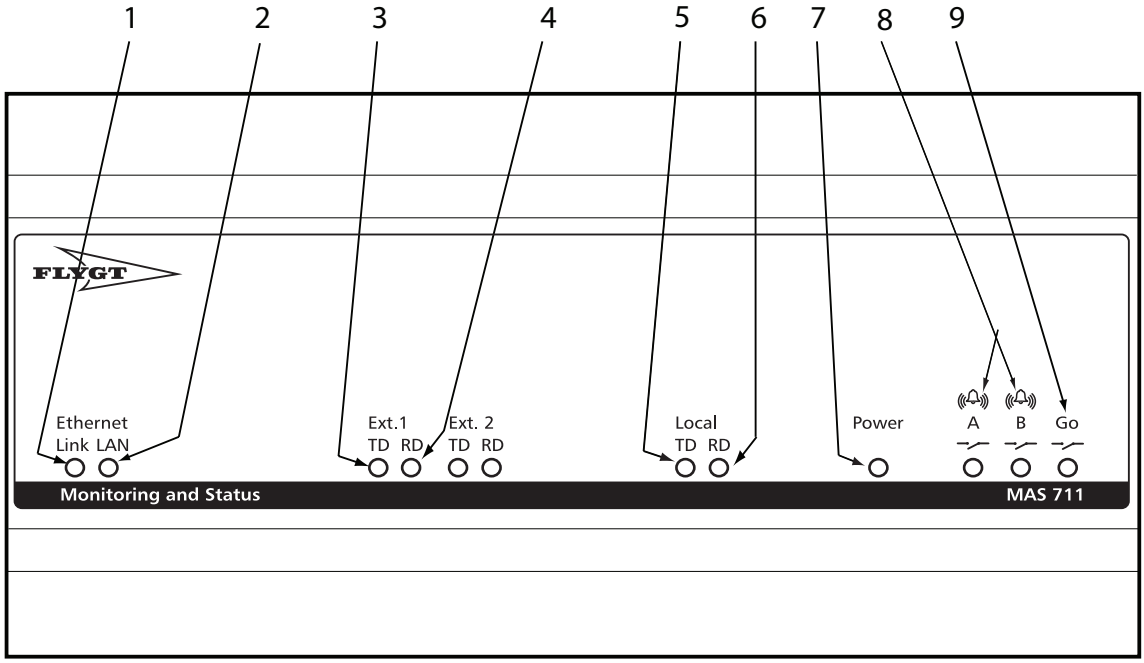
- Vibration sensor VIS 10 and Leakage sensor in the junction box at the same time.
- Analog temperature sensor (Pt100) for stator winding temperature in phases 2 and 3.
- Analog temperature sensor (Pt100) for support bearing temperature monitoring.

Base Unit Indication

Illustration

Light emitting diodes (LEDs) in the front are used for communication and relay indication.

This is an illustration of the base unit LEDs:



LED Indication Description

This table describes what the base unit LEDs indicate:

Number	LED name	Description	Type
1	Link	Ethernet connection status	Ethernet. Connection to LAN or PC for web access.
2	LAN	Data communication indication	
3	TD	Transmit data	Ext. 1/Ext. 2. RS–485/Modbus communication with APP/FMC or PLC (Ext. 1) and with Power analyzer (Ext. 2).
4	RD	Receive data	
5	TD	Transmit data	Local. RS–485/Modbus communication with operator panel and pump memory.
6	RD	Receive data	
7	Power	Light = Power on	Power indication
8	A/B	A = Pump stop, B = Warning	Alarm relay indication
9	Go	Green light = OK	Pump contactor interlock relay

Installation

Overview

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Installation Guideline

Guideline

This guideline gives an overview of the installation procedure. All steps are described in detail in the separate sections in the *Installation* chapter. This guideline only serves as an outline.

Follow these steps to make a complete installation and setup:

Step	Action
1	Read the entire chapter *General Safety Information*. **Comment:** This is important to prevent injuries to personnel and damages to the product.
2	Connect the unit.
3	If you choose to use the • web tool, go to step 4. • operator panel, go to step 5.
4	• Connect to the web tool. • Make the setup using the web tool. **Result:** The system is now ready to be used.
5	Make the setup using the operator panel. **Result:** The system is now ready to be used.

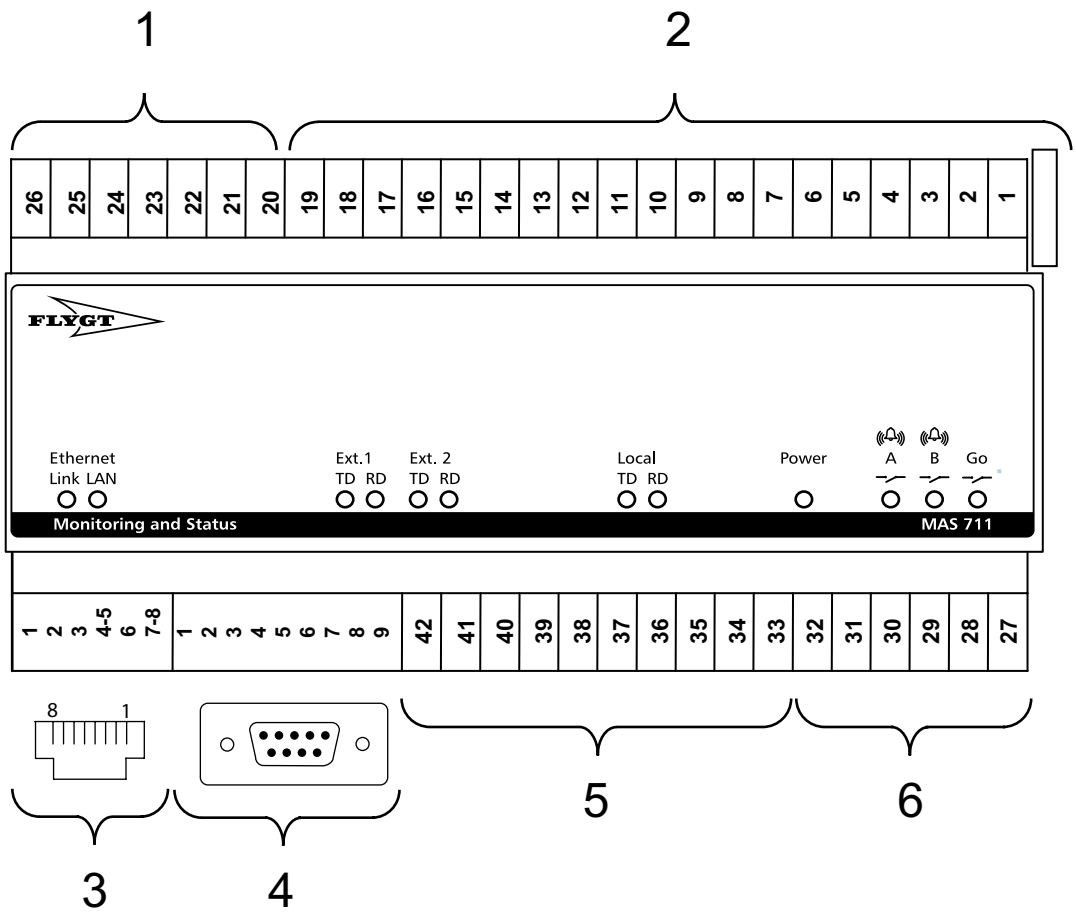
Connect the Unit

Topics in this Section

This section contains the following topics:

- General Instruction
- Wiring, Supply and Additional Inputs/Outputs
- Wiring, Modbus Communication
- Wiring, Relay Outputs
- Wiring, Large Pumps, SubCab 12–lead Sensor Cable
- Wiring, Large Pumps, SubCab 24–lead Sensor Cable
- Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 1
- Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 2
- Wiring, Midrange Pumps, SubCab 25–lead Sensor Cable

Base Unit Terminal Block



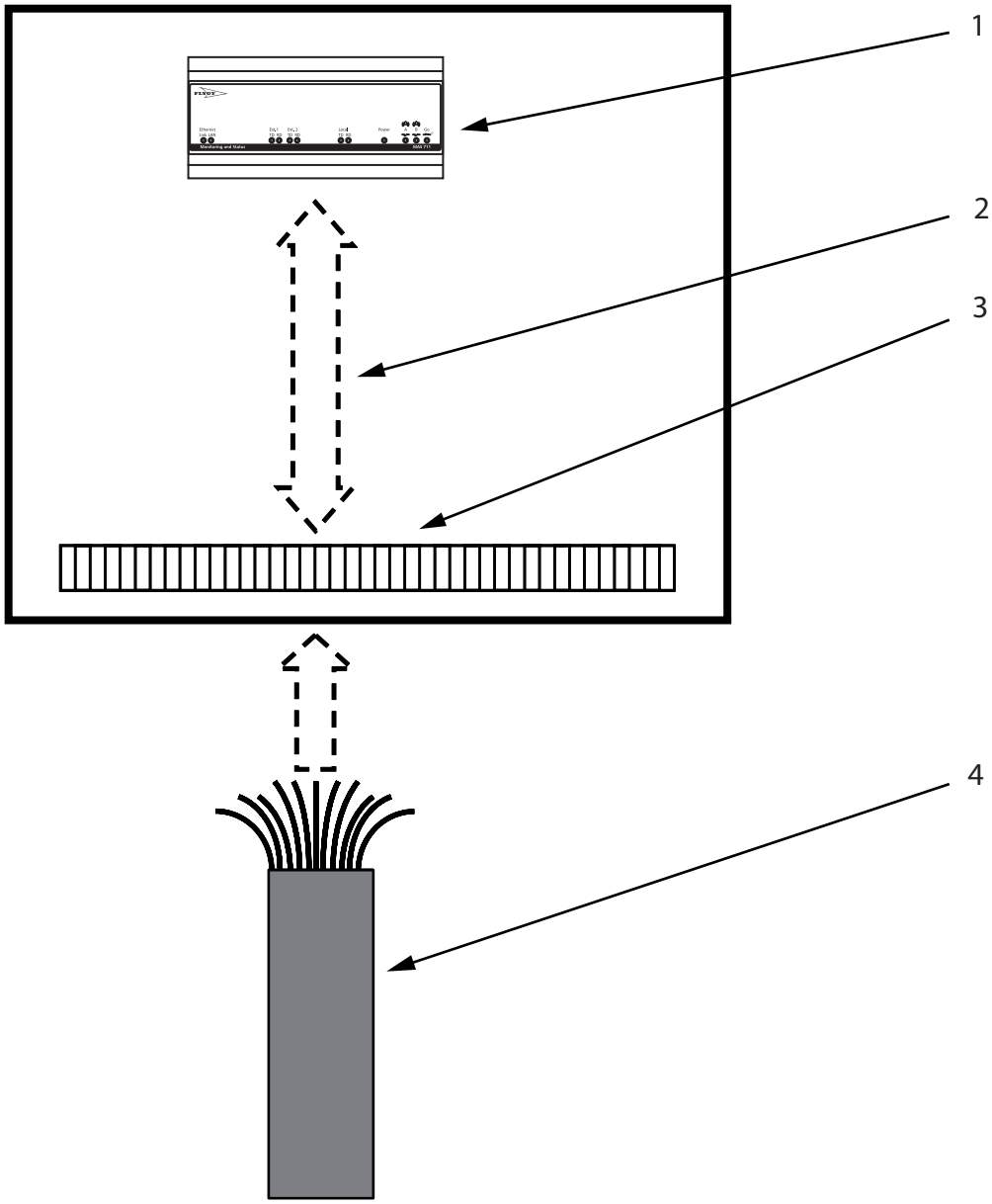
Terminal block section description

This table describes the main sections of the base unit terminal block:

Section number	Description
1	Supply and additional inputs/outputs
2	Sensor terminals
3	Ethernet port (RJ–45)
4	Serial port (RS–232)
5	Modbus communication (RS–485)
6	Relay outputs

General Instruction

Main Parts when Connecting the Unit



Description

This table describes the main parts when connecting the unit:

Section number	Description
1	Base unit terminal block
2	Cabinet cables
3	Cabinet connection block
4	Sensor cable

Wiring diagrams

Use the following wiring diagrams when connecting the unit:

- The wiring diagram of the cabinet.
- The applicable *Wiring* sections below.

Instruction

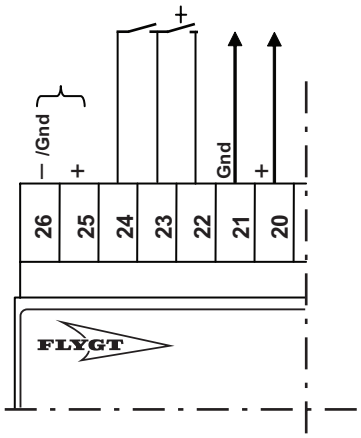
Follow the steps below to connect the unit:

Step	Action
1	Check which number on the cabinet connection block that is connected to which number on the base unit terminal block. This information is found in the wiring diagram of the cabinet. **Note!** The numbers of the base unit terminal block do *not* have to match the numbers of the cabinet connection block.
2	Connect the wires to the base unit according to the following sections below: • Wiring, Supply and Additional Inputs/Outputs • Wiring, Modbus communication • Wiring, Relay Outputs
3	Identify the applicable sensor configuration and connect the sensor cable to the cabinet connection block according to the applicable section below: • Wiring, Large Pumps, SubCab 12–lead Sensor Cable • Wiring, Large Pumps, SubCab 24–lead Sensor Cable • Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 1 • Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 2 • Wiring, Midrange Pumps, SubCab 25–lead Sensor Cable
4	Turn on the voltage to the unit.

Wiring, Supply and Additional Inputs/Outputs

Illustration

This is an illustration of section 1 of the base unit terminal block:



Terminal Description

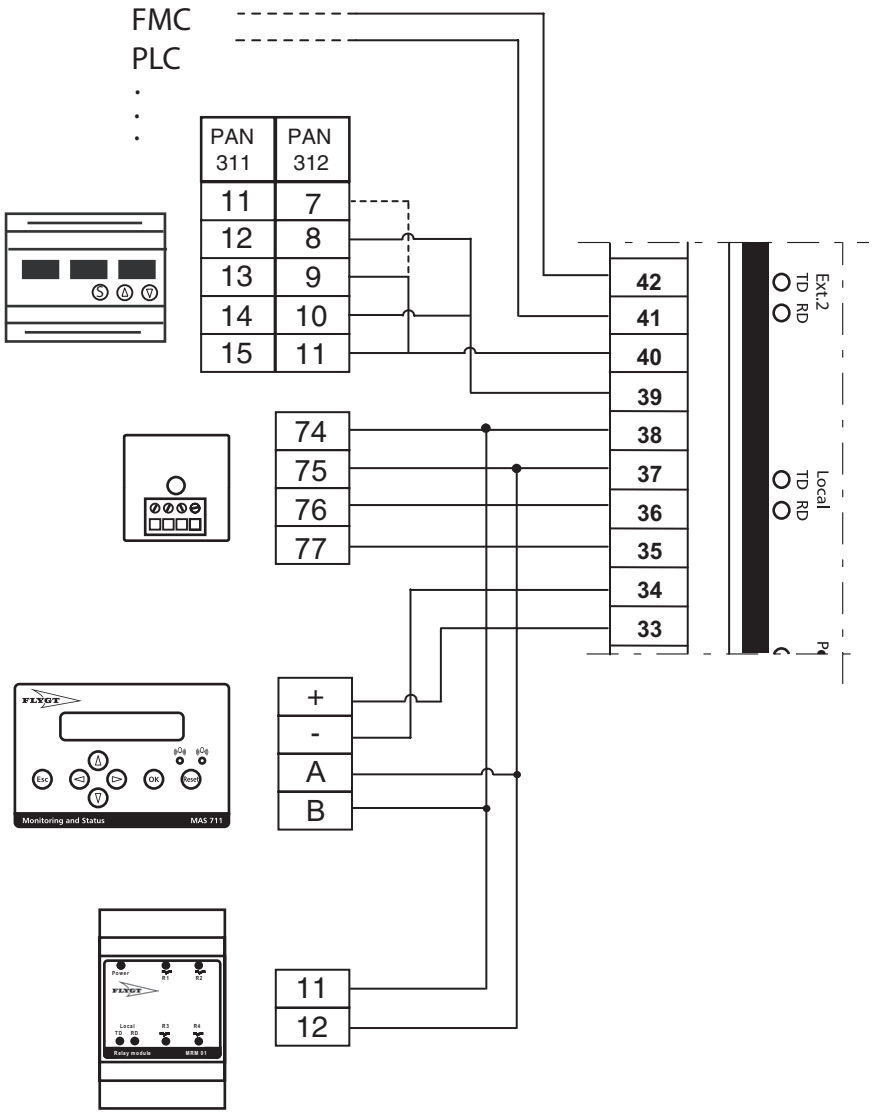
This table describes the terminals for supply and additional inputs/outputs:

Terminal number	Type	Description
20	+	Configurable output, 4-20 mA
21	Ground	Configurable output, ground
22	+	Reset input
23	Ground	RUN/reset, common ground
24	+	RUN input
25	+	Supply, 24 V AC/DC
26	–/ground	Supply, ground

Wiring, Modbus Communication

Illustration

This is an illustration of section 5 of the base unit terminal block:



Base Unit Terminal Description

This table describes the Modbus communication terminals (RS-485) of the base unit:

Terminal number	Type	Description
33	+	Supply to Operator panel, 12 V DC
34	Ground	Supply to Operator panel, ground
35	+	Supply to Pump memory, 12 V DC
36	Ground	Supply to Pump memory, ground
37	Local, A	RS-485, Operator panel, Pump memory and Relay Module (Modbus master)
38	Local, B	RS-485, Operator panel, Pump memory and Relay Module (Modbus master)
39	Ext 2, A	RS-485, Power Analyzer (Modbus master)
40	Ext 2, B	RS-485, Power Analyzer (Modbus master)
41	Ext 1, A	RS-485, Central system (Modbus slave)
42	Ext 1, B	RS-485, Central system (Modbus slave)

Pump Memory Terminal Description

This table describes the pump memory terminals:

Terminal number	Type	Description
74	Local, B	RS-485 (Modbus slave)
75	Local, A	RS-485 (Modbus slave)
76	Ground	Supply, ground
77	+	Supply, 12 V DC

Operator Panel Terminal Description

This table describes the operator panel terminals:

Terminal number	Type	Description
+	+	Supply, 12 V DC
–	Ground	Supply, ground
A	Local, A	RS-485 (Modbus slave)
B	Local, B	RS-485 (Modbus slave)

Power Analyzer Terminal Description

This table describes the Power analyzer terminals:

PAN 311, Terminal number	PAN 312, Terminal number	Description
11	7	Termination of the last unit in a series of connected units (T).
12	8	RS-485 (Modbus slave). Receive data + (Rx+, A).
13	9	RS-485 (Modbus slave). Receive data - (Rx–, B).
14	10	RS-485 (Modbus slave), Transmit data + (Tx+, A).
15	11	RS-485 (Modbus slave), Transmit data - (Tx–, B).

Relay Module Terminal Description

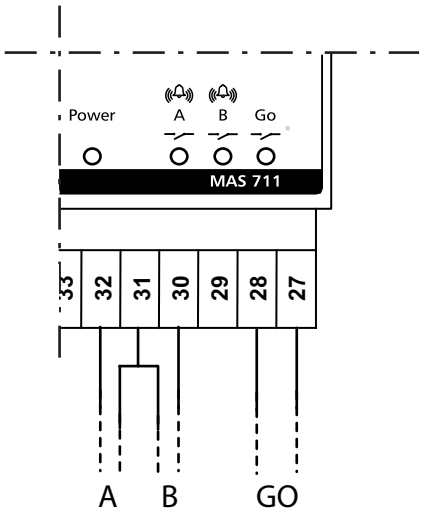
This table describes the Relay module terminals:

Terminal number	Type	Description
11	Local, B	RS-485 (Modbus slave)
12	Local, A	RS-485 (Modbus slave)

Wiring, Relay Outputs

Illustration

This is an illustration of section 6 of the base unit terminal block:



Terminal Description

This table describes the terminals for the relay outputs:

Terminal number	Description
27	Go relay (pump interlock), 5A/250V AC. Normally open.
28	Go relay (pump interlock), 5A/250V AC. Normally open.
29	Not used.
30	B alarm relay, 5A/250V AC. Normally open.
31	A/B alarm relay. Common terminal.
32	A alarm relay, 5A/250V AC. Normally open.

Wiring, Large Pumps, SubCab 12–lead Sensor Cable

NOTE!

The wires of the sensor cable shall be connected to the cabinet connection block. The numbers of the cabinet connection block will differ from the numbers of the base unit terminal block.

Wire Connection

This table shows the connection of the wires for a SubCab 12-lead sensor cable:

Sensor/Component	Sensor cable, no.	Base unit terminal block, no.
FLS — Leakage in stator housing [1)]	1	13
	2	14
Pt100 — Temperature measurement, main bearing	3	8
	4	4
Thermal switches — Temperature guard stator windings	5	1
	6	2
FLS — Leakage in junction box [1)]	7	15
	(2)	(14)
Pt100 — Temperature measurement, stator winding ph 1	8	3
	(4)	(4)
Pump memory:		
• RS–485 B [2)]	9	38
• RS-485 A [2)]	10	37
• Supply, ground	11	36
• Supply, 12V +	12	35
	(Screen)	If applicable, attach screen to ground terminals in the • pump top *and* • electrical cabinet.

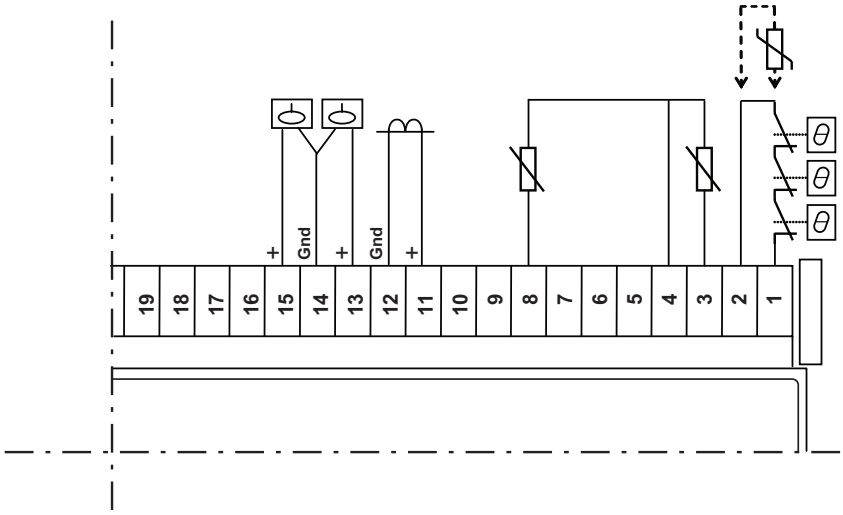
NOTE!

[1)] FLS means either of leakage sensors FLS/FLS10/FLS20/FLS30 depending on type of pump.

[2)] Communication port 37-38 for RS-485 is common to both pump memory and operator panel.

Terminal Diagram

This is a wiring diagram of the sensor terminals (section 2) used for a SubCab 12-lead sensor cable:



Terminal Description

This table describes the sensor terminals (section 2) used for a SubCab 12-lead sensor cable:

Terminal Number	Type	Description
19		Not used
18		Not used
17		Not used
16		Not used
15	+	Leakage in junction box, FLS
14	Ground	Leakage in junction box/stator housing, common ground
13	+	Leakage in stator housing, FLS
12	Ground	Pump current transformer input, ground
11	+	Pump current transformer input 1A AC
10		Not used
9		Not used
8	+	Temp measurement, main bearing, Pt100
7		Not used
6		Not used
5		Not used
4	Ground	Temp measurement main bearing/stator winding ph 1, common ground
3	+	Temp measurement, stator winding ph 1, Pt100
2	Ground	Temp guard, stator windings ph 1-3, ground
1	+	Temp guard, stator windings ph 1-3, Thermal switches

Wiring, Large Pumps, SubCab 24–lead Sensor Cable

NOTE!

The wires of the sensor cable shall be connected to the cabinet connection block. The numbers of the cabinet connection block will differ from the numbers of the base unit terminal block.

Wire Connection

This table shows the connection of the wires for a SubCab 24-lead sensor cable:

Sensor/Component	Sensor cable, no.	Base unit terminal block, no.
FLS — Leakage in stator housing [1)]	1	13
	2	14
Pt100 — Temperature measurement, main bearing	3	8
	4	4
Thermal switches — Temperature guard stator windings	5	1
	6	2
FLS — Leakage in junction box [1)]	7	15
	(2)	(14)
Pt100 — Temperature measurement, stator winding ph 1	8	3
	(4)	(4)
Pump memory:		
• RS–485 B [2)]	9	38
• RS-485 A [2)]	10	37
• Supply, ground	11	36
• Supply, 12V +	12	35
Pt100 — Temperature measurement, stator winding ph 2	13	5
	14	7
Pt100 — Temperature measurement, stator winding ph 3	15	6
	16	7
Pt100 — Temperature measurement, support bearing	17	9
	18	10
CLS — Leakage in oil housing	19	17
	20	16
VIS 10 — Vibration sensor	21	18
	22	19
	(Screen)	If applicable, attach screen to ground terminals in the • pump top *and* • electrical cabinet.

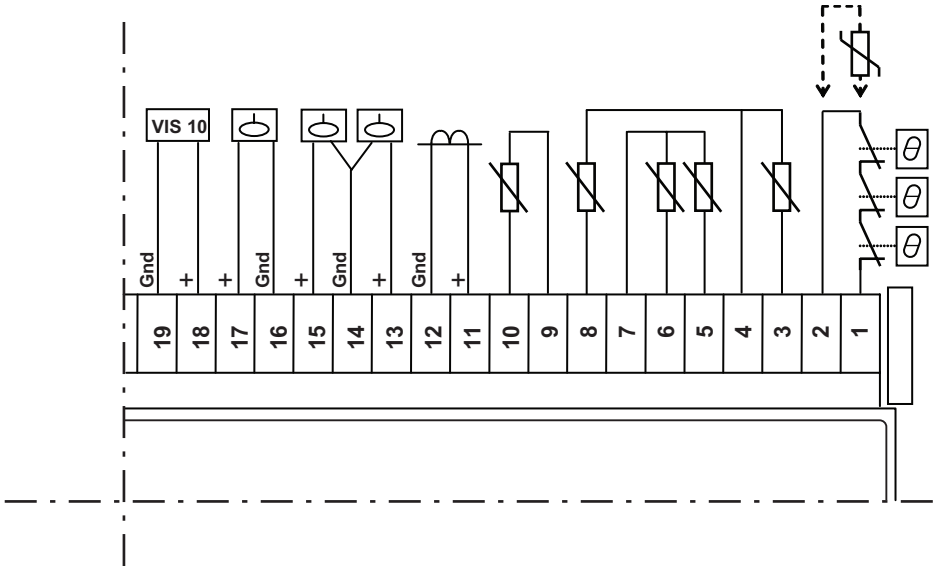
NOTE!

[1] FLS means either of leakage sensors FLS/FLS10/FLS20/FLS30 depending on type of pump.

[2] Communication port 37-38 for RS-485 is common to both pump memory and operator panel.

Terminal Diagram

This is a wiring diagram of the sensor terminals (section 2) used for a SubCab 24-lead sensor cable:



Terminal Description

This table describes the sensor terminals (section 2) used for a SubCab 24-lead sensor cable:

Terminal Number	Type	Description
19	Ground	Vibration or optional sensor input, ground
18	+	Vibration or optional sensor input, 4-20 mA
17	+	Leakage in oil housing, CLS
16	Ground	Leakage in oil housing, ground
15	+	Leakage in junction box, FLS
14	Ground	Leakage in junction box/stator housing, common ground
13	+	Leakage in stator housing, FLS
12	Ground	Pump current transformer input, ground
11	+	Pump current transformer input 1A AC
10	+	Temp measurement, support bearing, ground
9	Ground	Temp measurement, support bearing, Pt100
8	+	Temp measurement, main bearing, Pt100

Terminal Number	Type	Description
7	Ground	Temp measurement stator winding ph 2/ph 3, common ground
6	+	Temp measurement, stator winding ph 3, Pt100
5	+	Temp measurement, stator winding ph 2, Pt100
4	Ground	Temp measurement main bearing/stator winding ph 1, common ground
3	+	Temp measurement, stator winding ph 1, Pt100
2	Ground	Temp guard, stator windings ph 1-3, ground
1	+	Temp guard, stator windings ph 1-3, Thermal switches

Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 1

NOTE!

The wires of the sensor cable shall be connected to the cabinet connection block. The numbers of the cabinet connection block will differ from the numbers of the base unit terminal block.

Wire Connection

This table shows the connection of the wires for a SubCab 12-lead sensor cable, 1 (leakage sensor in junction box, no vibration sensor):

Sensor/Component	Sensor cable, no. [1]	Base unit terminal block, no.
FLS10 — Leakage in inspection chamber	1	17
	2	16
Pt100 — Temperature measurement, main bearing	3	8
	4	4
Thermal switches — Temperature guard stator windings	5	1
	6	2
FLS — Leakage in junction box	7	15
	(2)	(16)
Pt100 — Temperature measurement, stator winding ph 1	8	3
	(4)	(4)
Pump memory:		
• RS–485 B [2]	9	38
• RS-485 A [2]	10	37
• Supply, ground	11	36

Sensor/Component	Sensor cable, no. [1]	Base unit terminal block, no.
• Supply, 12V +	12	35
	(Screen)	If applicable, attach screen to ground terminals in the • pump top *and* • electrical cabinet.

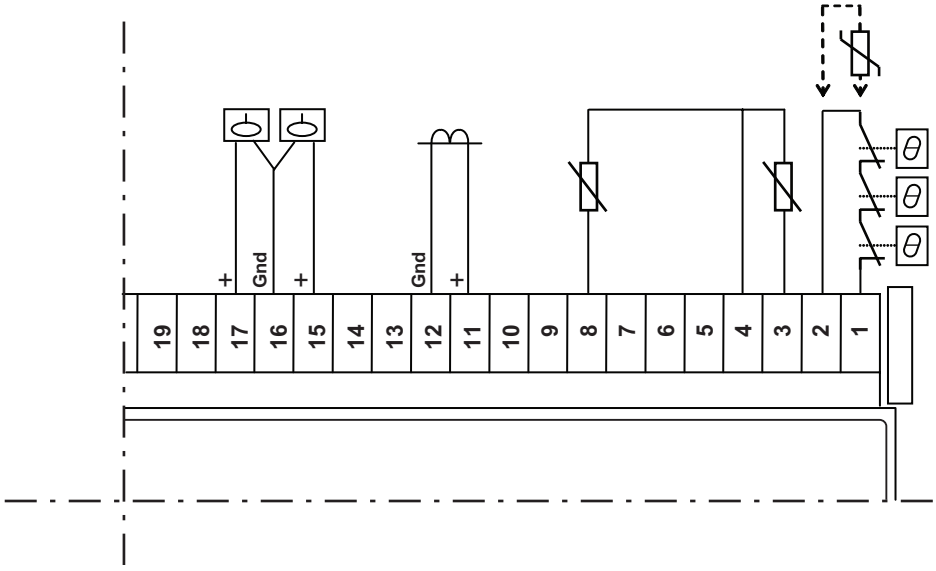
NOTE!

[1] If the sensor cable contains a green-yellow lead, that lead should *not* be connected.

[2] Communication port 37-38 for RS-485 is common to both pump memory and operator panel.

Terminal Diagram

This is a wiring diagram of the sensor terminals (section 2) used for a SubCab 12-lead sensor cable, 1 (leakage sensor in junction box, no vibration sensor):



Terminal Description

This table describes the sensor terminals (section 2) used for a SubCab 12-lead sensor cable, 1 (leakage sensor in junction box, no vibration sensor):

Terminal Number	Type	Description
19		Not used
18		Not used
17	+	Leakage in inspection chamber, FLS
16	Ground	Leakage in inspection chamber/junction box, common ground
15	+	Leakage in junction box, FLS
14		Not used
13		Not used

Terminal Number	Type	Description
12	Ground	Pump current transformer input, ground
11	+	Pump current transformer input 1A AC
10		Not used
9		Not used
8	+	Temp measurement, main bearing, Pt100
7		Not used
6		Not used
5		Not used
4	Ground	Temp measurement main bearing/stator winding ph 1, common ground
3	+	Temp measurement, stator winding ph 1, Pt100
2	Ground	Temp guard, stator windings ph 1-3, ground
1	+	Temp guard, stator windings ph 1-3, Thermal switches

Wiring, Midrange Pumps, SubCab 12–lead Sensor Cable, Alternative 2

NOTE!

The wires of the sensor cable shall be connected to the cabinet connection block. The numbers of the cabinet connection block will differ from the numbers of the base unit terminal block.

Wire Connection

This table shows the connection of the wires for a SubCab 12-lead sensor cable, 2 (vibration sensor, no leakage sensor in junction box):

Sensor/Component	Sensor cable, no. [1]	Base unit terminal block, no.
FLS10 — Leakage in inspection chamber	1	17
	2	16
Pt100 — Temperature measurement, main bearing	3	8
	4	4
Thermal switches — Temperature guard stator windings	5	1
	6	2
VIS 10 — Vibration sensor [2]	7	18
	(2)	(16)
Pt100 — Temperature measurement, stator winding ph 1	8	3
	(4)	(4)
Pump memory:		
• RS–485 B [3]	9	38
• RS-485 A [3]	10	37

Sensor/Component	Sensor cable, no. [1]	Base unit terminal block, no.
• Supply, ground	11	36
• Supply, 12V +	12	35
	(Screen)	If applicable, attach screen to ground terminals in the • pump top *and* • electrical cabinet.

NOTE!

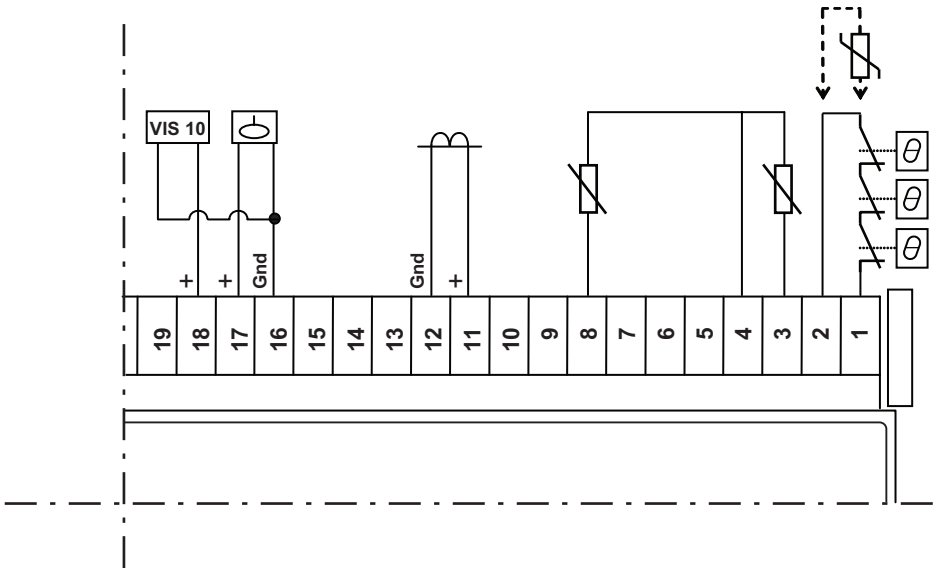
[1] If the sensor cable contains a green-yellow lead, that lead should *not* be connected.

[2] VIS 10 is not applicable to pump type 3153.

[3] Communication port 37-38 for RS-485 is common to both pump memory and operator panel.

Terminal Diagram

This is a wiring diagram of the sensor terminals (section 2) used for a SubCab 12-lead sensor cable, 2 (vibration sensor, no leakage sensor in junction box):



Terminal Description

This table describes the sensor terminals (section 2) used for a SubCab 12-lead sensor cable, 2 (vibration sensor, no leakage sensor in junction box):

Terminal Number	Type	Description
19		Not used
18	+	Vibration or optional sensor input, 4-20 mA
17	+	Leakage in inspection chamber, FLS
16	Ground	Leakage in inspection chamber/vibration, common ground

Terminal Number	Type	Description
15		Not used
14		Not used
13		Not used
12	Ground	Pump current transformer input, ground
11	+	Pump current transformer input 1A AC
10		Not used
9		Not used
8	+	Temp measurement, main bearing, Pt100
7		Not used
6		Not used
5		Not used
4	Ground	Temp measurement main bearing/stator winding ph 1, common ground
3	+	Temp measurement, stator winding ph 1, Pt100
2	Ground	Temp guard, stator windings ph 1-3, ground
1	+	Temp guard, stator windings ph 1-3, Thermal switches

Wiring, Midrange Pumps, 25–lead Sensor Cable

NOTE!

The wires of the sensor cable shall be connected to the cabinet connection block. The numbers of the cabinet connection block will differ from the numbers of the base unit terminal block.

Wire Connection

This table shows the connection of the wires for a 25-lead sensor cable:

Sensor/Component	Sensor cable, no. [1)]	Base unit terminal block, no.
FLS10 — Leakage in inspection chamber	1	17
	2	16
Pt100 — Temperature measurement, main bearing	3	8
	4	4
Thermal switches — Temperature guard stator windings	5	1
	6	2
FLS — Leakage in junction box	7	15
	(2)	(16)
Pt100 — Temperature measurement, stator winding ph 1	8	3
	(4)	(4)

Sensor/Component	Sensor cable, no. [1]	Base unit terminal block, no.
Pump memory:		
• RS–485 B [2]	9	38
• RS-485 A [2]	10	37
• Supply, ground	11	36
• Supply, 12V +	12	35
Pt100 — Temperature measurement, stator winding ph 2	13	5
	14	7
Pt100 — Temperature measurement, stator winding ph 3	15	6
	16	7
Pt100 — Temperature measurement, support bearing	17	9
	18	10
VIS 10 — Vibration sensor [3]	21	18
	22	19
	(Screen)	If applicable, attach screen to ground terminals in the • pump top *and* • electrical cabinet.

NOTE!

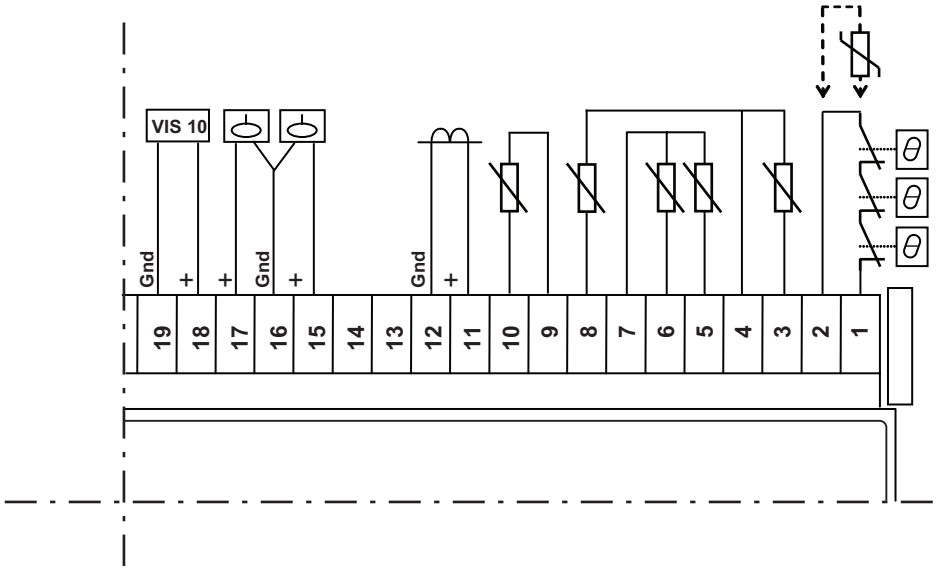
[1] If the sensor cable contains a green-yellow lead, that lead should *not* be connected.

[2] Communication port 37-38 for RS-485 is common to both pump memory and operator panel.

[3] VIS 10 is not applicable to pump type 3153.

Terminal Diagram

This is a wiring diagram of the sensor terminals (section 2) used for a 25-lead sensor cable:



Terminal Description

This table describes the sensor terminals (section 2) used for a 25–lead sensor cable:

Terminal Number	Type	Description
19	Ground	Vibration or optional sensor input, ground
18	+	Vibration or optional sensor input, 4-20 mA
17	+	Leakage in inspection chamber, FLS
16	Ground	Leakage in inspection chamber/junction box, common ground
15	+	Leakage in junction box, FLS
14		Not used
13		Not used
12	Ground	Pump current transformer input, ground
11	+	Pump current transformer input 1A AC
10	+	Temp measurement, support bearing, ground
9	Ground	Temp measurement, support bearing, Pt100
8	+	Temp measurement, main bearing, Pt100
7	Ground	Temp measurement stator winding ph 2/ph 3, common ground
6	+	Temp measurement, stator winding ph 3, Pt100
5	+	Temp measurement, stator winding ph 2, Pt100
4	Ground	Temp measurement main bearing/stator winding ph 1, common ground
3	+	Temp measurement, stator winding ph 1, Pt100
2	Ground	Temp guard, stator windings ph 1-3, ground
1	+	Temp guard, stator windings ph 1-3, Thermal switches

Connect to the Web Tool

Topics in this Section

This section contains the following topics:

- General Instruction
- Make a Direct Connection
- Make a LAN Connection
- Make a Modem Connection

General Instruction

Instruction

Follow the steps below to connect to the web tool:

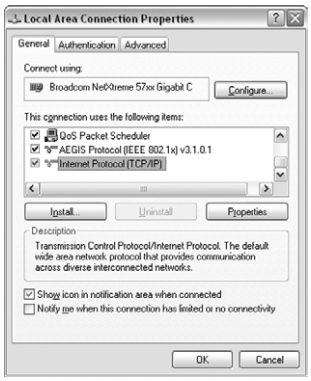
Step	Action
1	Select one of the following connection methods: • Make a direct connection (between a computer and base unit — Ethernet and TCP/IP). Recommended for installation purposes. • Make a LAN connection (connect the base unit to a Local Area Network — Ethernet and TCP/IP). • Make a modem connection (connect a computer and the base unit using modem and PPP, point-to-point protocol).
2	Connect to the web tool using the applicable instruction below.

Make a Direct Connection

Instruction

Follow these steps to make a direct connection between a computer and the base unit:

Step	Action	Comment/Result
1	Connect a cross-over ethernet cable between the base unit and the computer.	Cross-over Cat5E Ethernet Patch cable with RJ-45 plugs on each end
2	Follow step 3–8 below to set the IP address of the computer to match the present IP address of the unit.	

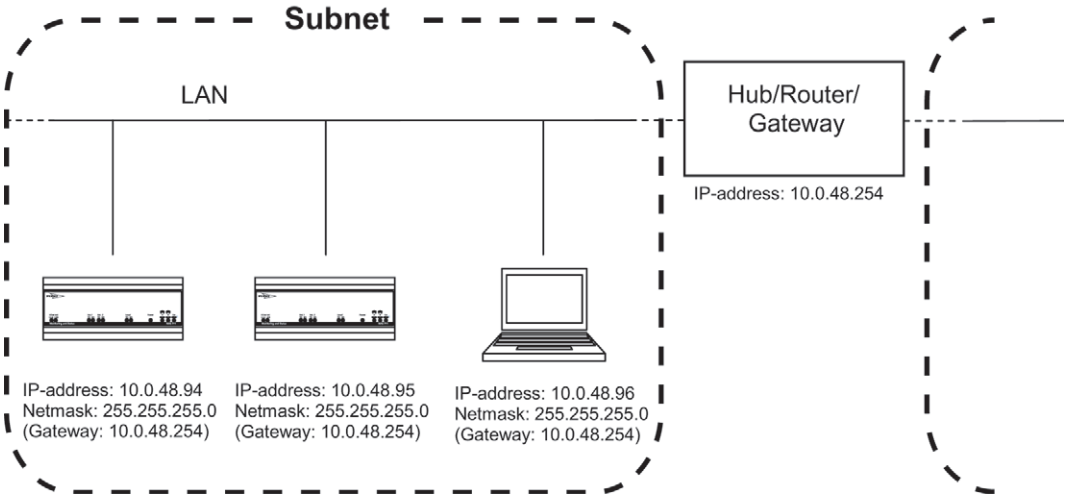
Step	Action	Comment/Result
3	Click Start — Control panel and double click Network connections — Local area connection (name).	
4	Click Properties.	
5	Select Internet Protocol (TCP/IP) in the list and click Properties.	
6	If the option **Use the following IP address** is used, write down the existing IP address (to be able to restore the IP settings of your computer later).	
7	Tick **Use the following IP address** and enter an address in the IP address field. Use for example computer IP address 10.0.48.4 if the MAS default IP address is used (10.0.48.94).	The three first groups of the IP address must be the same for the unit and the computer. This makes them part of the same subnet. The number in the last group must be different to make them unique nodes in the network.
8	• Set Subnet mask to 255.255.255.0. • Click OK and close the dialog boxes.	

Step	Action	Comment/Result
9	• Start a web browser (for example Internet Explorer). • Enter the IP address of the unit (default is http://10.0.48.94) in the address field and click Enter.	
10	Click Login.	The Login dialog box is opened.
11	Enter user name (config) and password (default is ef56) in the login dialog box and click OK.	The web tool Quick overview is opened.

Make a LAN Connection

Illustration: Connection Example

This is an illustration of a LAN connection example with IP settings for two (or more) base units and a computer in a network (see the instructions below):



Instruction

Choose one of the following methods to make a LAN connection:

- Make a LAN connection using a local computer.
- Make a LAN connection using the operator panel.

Make a LAN connection using a local computer

Follow these steps to make a connection between a computer and the base unit over a Local Area Network (LAN) using a local computer:

1. Contact a local network administrator to check if the IP address and additional ethernet settings of the base unit have to be changed before connecting to an existing LAN. If the base unit IP address

- has to be changed, continue with step 2.
- does not have to be changed, continue with step 6.

Comment: The IP address and ethernet settings of the base unit must not interfere with existing network units.

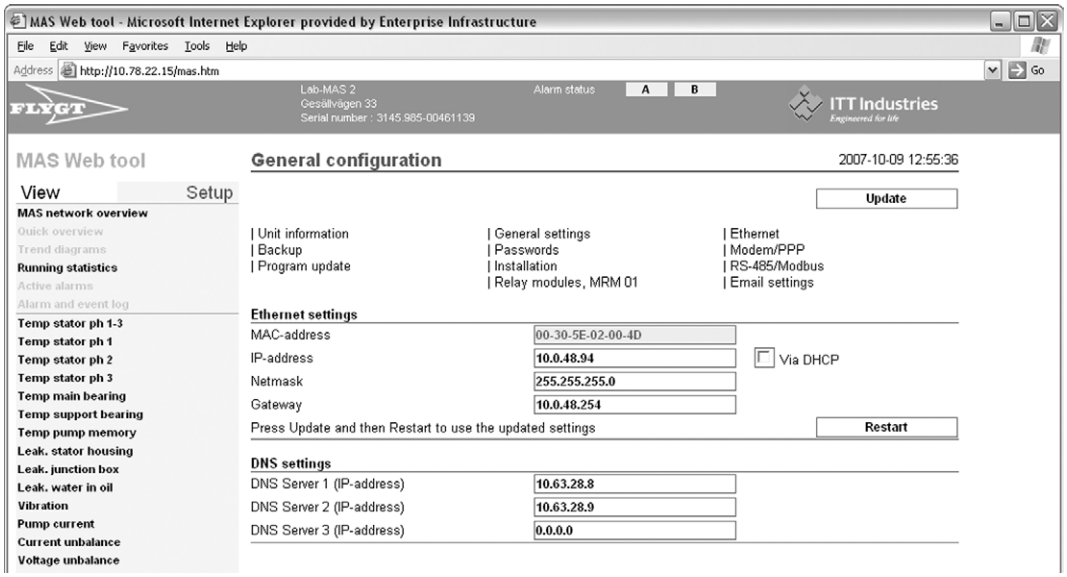
2.

- Make a direct connection according to the instruction above, Make a Direct Connection.
- Click Login.

Result: The web tool login dialog box is opened.

3. Enter user name (config) and password (default: ef56) in the login dialog box and click OK.
Result: The web tool Quick overview is opened.

4. Click Setup – General configuration – Ethernet.
Result: The Ethernet (and DNS) settings window is opened.



5.

- Enter an IP-address for the base unit that is compliant with the existing LAN (check with the network administrator).
- Enter the Netmask (normally 255.255.255.0, check with the network administrator).
- If the network consists of several subnets, enter the IP address to the gateway/hub/router (otherwise leave it blank).
- Click Update and then Restart.

Comment: If more than one unit is to be connected to the LAN, the three first groups of the IP address must be the same for the different units. This makes them part of the same subnet. The number in the last (rightmost) group must be different for the units to make them unique nodes in the network.

6. Connect the unit to the LAN using an ethernet cable (CAT5 patch cable with RJ-45 plugs).

7. If the IP address of the computer

- has to be changed to match the IP address of the LAN, continue with step 8.
- already matches the IP address of the LAN, continue with step 11.

8. Click Start — Control panel and double click Network connections — Local area connection.
Result: The Local Area Connection Status dialog box is opened.

9.

- Click Properties.
- Select **Internet Protocol (TCP/IP)** and click Properties in the Local Area Connection Properties dialog box.
  Result: The Internet Protocol (TCP/IP) Properties dialog box is opened.

10.
- Tick **Use the following IP address** and enter the computer address in the IP address field.
- Click OK and close the dialog boxes.

11. Connect the computer to the LAN using an ethernet cable (CAT5 patch cable with RJ-45 plugs).

12.
- Start a web browser (for example Internet Explorer).
- Enter the IP address of the unit (default is http://10.0.48.94) in the address field and click Enter.
  Result: The web tool login window is opened.

13. Click Login.
Result: The Login dialog box is opened.

Make a LAN connection using the operator panel

Follow these steps to make a connection between a computer and the base unit over a Local Area Network (LAN) using the operator panel:

1. Contact a local network administrator to check if the IP address and additional ethernet settings of the base unit have to be changed before connecting to an existing LAN. If the base unit IP settings
- has to be changed, continue with step 2.
- does not have to be changed, continue with step 9.
  Comment: The IP address and ethernet settings of the base unit must not interfere with existing network units.

2.
- Go to Log in (2.3) in the Setup menu.
- Press OK to enter edit mode.
  Result: Position 1 of the password is flashing.

3.
- Press up arrow once to enter the digit 1.
- Move to the next position using right arrow.

4.
- Enter the rest of the password (default is 1234) using up and right arrow.
- Press OK.
  Result: Menu Change password (2.4) is displayed.

5.
- Go to General config (2.5) in the Setup menu using down arrow.
- Press OK to enter menu Clock (2.5.1).
- Go to menu Ethernet IP address (2.5.16) using down arrow.
  Comment: If more than one unit is to be connected to the LAN, the three first groups of the IP address must be the same for the different units. This makes them part of the same subnet. The number in the last (rightmost) group must be different for the units to make them unique nodes in the network.

6. Enter an IP-address for the base unit that is compliant with the existing LAN (check with the network administrator):
- Press OK to enter edit mode.
- Change value in position 1 using up/down arrow.
- Go to position 2 using right arrow and change value.

- Change all positions to form the desired IP address.
- Press OK and confirm with OK.
  Result:”Value saved” is displayed briefly.
  Comment: Period (.) is found after number 9 and space ( ) before number 0.

7.
- Go to menu Ethernet netmask (2.5.17).
- Enter the netmask (normally 255.255.255.0, check with the network administrator) in the way described in step 6.

8.
- If the network consists of several subnets, go to menu Ethernet gateway (2.5.18).
- Enter the IP address to the gateway/hub/router in the way described in step 6.

9. For the IP settings to take effect, restart the base unit by disconnecting the power supply briefly.

10. Connect the unit to the LAN using an ethernet cable (CAT5 patch cable with RJ-45 plugs).

11. If the IP address of the computer
- has to be changed to match the IP address of the unit, continue with step 11.
- already matches the IP address of the unit, continue with step 13.

12.
- Click Start — Control panel and double click Network connections — Local area connection.
- Click Properties in the Local Area Connection Status dialog box.
- Select **Internet Protocol (TCP/IP)** and click Properties in the Local Area Connection Properties dialog box.

13.
- Tick **Use the following IP address** and enter the computer address in the IP address field in the Internet Protocol (TCP/IP) Properties dialog box:
- Click OK and close the dialog boxes.

14. Connect the computer to the LAN using an ethernet cable (CAT5 patch cable with RJ-45 plugs).

15.
- Start a web browser.
- Enter the IP address of the unit (default is http://10.0.48.94) in the address field and click Enter.
  Result: The web tool is opened.

16. Click Login.
  Result: The Login dialog box is opened.

17. Enter user name (config) and password (default is ef56) in the login dialog box and click OK.
  Result: The web tool Quick overview is opened.

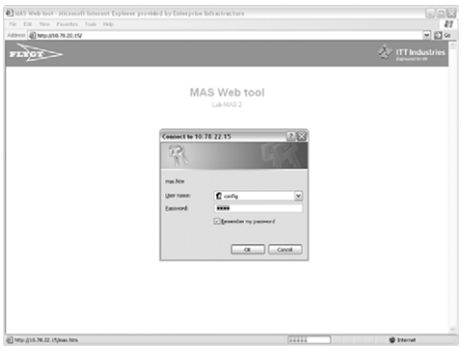
Make a Modem Connection

Instruction

Instruction

Follow these steps to make a modem connection between a computer and the base unit:

Step	Action	Comment/Result
1	• Connect a modem (PSTN, GSM or GPRS) to the base unit using a cable with RS-232, 9-pole Dsub connectors. • Connect the computer modem to a telephone jack.	
2	Click Start — Control panel and double click Network connections — New Connection Wizard.	The New Connection Wizard is opened.
3	Click Next.	
4	• Select **Connect to the network at my workplace** and click Next. • Select **Dial-up connection** in the Network Connection dialog box and click Next.	The Connection name dialog box is opened.
5	• Enter a suitable name for your new connection and click Next. • Enter the number to the modem in the Phone Number to Dial dialog box (you may have to add a 0 or a 9 to get a public line) and click Next.	
6	Make additional settings according to the instructions on the screen and click Finish.	
7	Click Dial.	**Result:** A message acknowledges that a connection is established. **Comment:** User name and password are not necessary here.

Step	Action	Comment/Result
8	• Start a web browser. • Enter the IP address of the unit (default is http://192.168.48.95) in the address field and click Enter.	
9	Click Login.	The Login dialog box is opened.
10	Enter user name (config) and password (default is ef56) in the login dialog box and click OK.	The web tool Quick overview is opened.

First Setup Using the Web Tool

Instruction

This instruction is applicable to an installation of
- a “new” MAS
- a MAS for retrofit of a CAS.

Follow these steps to set up using the web tool:

Step	Action	Detailed instruction in chapter ***Settings with the Web Tool***
1	Enter user name (config) and password (default is ef56) in the web tool login dialog box and click OK.	*Change Password*
2	If you want to select another language for the web tool interface, click Setup — General configuration – General settings and select language.	*Change Display Language*
3	Click (Setup — General configuration —) Unit information and set unit information.	*Set Unit Information*
4	Click (Setup — General configuration —) RS-485/Modbus and activate/configure communication for applicable connected units: Pump memory, Operator panel, Relay Module, Power analyzer, Higher level controller (Flygt APP/FMC or PLC).	*Configure Communication (RS-485, Modbus)*
5	If there is • a pump memory in the system, continue with step 6. • *no* pump memory in the system (for example for retrofit of a CAS), continue with step 7.	
6	Click (Setup —) Pump Info — Pump memory and perform **Copy all from pump memory to MAS**. **Result:** “Synchronization OK!” confirms when the synchronization is performed. The base unit is now set up with the selection of sensors in the actual pump and the recommended factory alarm settings. See the Quick overview.	*Copy Data To/From Pump Memory* (in chapter *Operation*)
7	Click Setup and a selected channel in the main menu if you want to activate a channel or make any additional/manual settings.	*Make a Manual Setting of a Monitoring Channel*
8	If the pump is installed in an explosive or flammable environment, make sure that the motor overheating protection function (Temp stator ph 1-3) is setup to stop the pump, that is, an A-alarm. The protection function must also be set to manual reset (not automatic).	*Make a Manual Setting of a Monitoring Channel*

Step	Action	Detailed instruction in chapter ***Settings with the Web Tool***
9	Use one of the following methods to enable recording of pump running time and number of starts: • **Power analyzer** Click Setup — Pump current and activate/set the associated channels (Pump current, Current unbalance, Voltage unbalance/System voltage, System power, System power factor). • **Current transformer** Click Setup — Pump current and select **Pump current input (MAS)** as Input source. • **Run input (pump on/off)** Click Setup — Pump current and select **Run input (MAS)** as Input source. • **No possibility to record** If there is no possibility to record starts and running time in the system, continue with step 10.	*Record Running Time and Number of Starts*
10	If the pump is placed at a distance from the base unit exceeding 30 meters, • click Setup – applicable channel (channel using Pt100 sensor) • measure the resistance in the leads or calculate a value and enter it as a compensation for long leads.	*Compensate for Measurement Error due to Long Leads*
11	If you want to start fresh with an empty database (no logged data), • click **Reset min/max** at the bottom of the Quick overview or go through all channels individually and click Reset min/max. • click Setup — Data log, select **All** and click Clear. • click (Setup —) Running statistics and click **Reset ALL**. • reset energy recordings directly on the Power analyzer using the keypad. See Power Analyzer PAN 311/312 manual.	*Preserve, Upload and Delete Measurement Data* (in chapter *Operation*)
12	Click (Setup —) Pump Info — Data plate if you want to enter additional data plate information in the Custom text field.	*Handle Pump Information and Service Functions Using the Web Tool* (in chapter *Operation*)
13	Click (Setup — Pump Info —) Service log if you want to make service notes in the Service log edit field.	*Handle Pump Information and Service Functions Using the Web Tool* (in chapter *Operation*)

Step	Action	Detailed instruction in chapter ***Settings with the Web Tool***
14	Click (Setup — Pump Info —) Service interval if you want to make changes to the service intervals.	*Handle Pump Information and Service Functions Using the Web Tool* (in chapter *Operation*)
15	• Click View – Trend diagrams to see if the graph on that page is displayed properly. • If a graph is not displayed, download a Java module to be able to view Java applets (and graphs). A Java download dialog box should be displayed automatically.	
16	If you have used the method Direct Connection between a Computer and the Base Unit, restore the IP address of the computer (to **Obtain an IP address automatically** or to the original IP address).	*Make a Direct Connection* (in section *Connect to the Web Tool* in chapter *Installation*)
17	Disconnect the computer. **Result:** The system is now ready to be used.	

First Setup Using the Operator Panel

Instruction

When setting up using the operator panel, use the operator panel
- menu system (see chapter *Use the Operator Panel*) *and*
- menu navigation help.

Follow these steps to set up using the operator panel.

Step	Action	Detailed instruction in chapter ***Settings with the Operator Panel***
1	In the View menu, press down arrow and OK to enter the Setup menu branch.	
2	If you want to change the default language (English), press OK to enter edit mode and select the desired language.	*Change Display Language*
3	Enter the default password 1234 and login to the protected part of the setup menus. **Result:** Menu Change password (2.4) is displayed.	*Log in and Change Password*
4	Go to General config (2.5) and set the unit information: • Date and time. • Temperature unit (by default °C). • MAS id (unit number)	*Set Unit Information*
5	If there is • a pump memory in the system, continue with step 6 • *no* pump memory in the system (for example for retrofit of a CAS), continue with step 7.	
6	• Set communication to **Active** for the pump memory. • Perform **Copy all from PM to MAS**.	*Retrieve Sensor Information from Pump Memory*
7	• If a Power analyzer (optional) is used, set its communication to **Active** (EXT2). • Use default parameters for baudrate, id and type.	See the Power analyzer manual on how to set the analyzer
8	• If a Higher level controller (optional) is used, set its communication to **Active** (EXT1). • Select Modbus id to fit into the Modbus network (MAS units are Modbus slaves). • Use the default baudrate.	
9	• Check with your network administrator if you have to set ethernet IP address or other ethernet parameters for use on a LAN. • Press Esc to leave General config.	
10	If you wish to add an extra monitoring channel or adjust the settings, for example alarm trip limits or alarm delays, for existing channels, use the menus 2.6–2.21 in the Setup menu.	*Make a Manual Setting of a Monitoring Channel*

Step	Action	Detailed instruction in chapter ***Settings with the Operator Panel***
11	If the pump is installed in an explosive or flammable environment, make sure that the motor overheating protection function (Temp stator ph 1-3) is setup to stop the pump, that is, an A-alarm. The protection function must also be set to manual reset (not automatic).	*Make a Manual Setting of a Monitoring Channel*
12	Use one of the following methods to enable recording of pump running time and number of starts: • **Power analyzer** – Select **Current (Power an.)** as Input source. – Activate the associated channels and set the alarm limits (Pump current, Current unbalance, Voltage unbalance/System voltage, System power, System power factor). • **Current transformer** Select **Current input (MAS)** as Input source. • **Run input (pump on/off)** Select **Run input (MAS)** as Input source. • **No possibility to record** If there is no possibility to record starts and running time in the system, continue with step 13.	*Record Running Time and Number of Starts*
13	Go to General config (2.5) and make settings for Service interval (2.5.2).	*Set Service Interval Using the Operator Panel* (in chapter *Operation*)
14	• If the pump is placed at a distance from the base unit exceeding 30 meters, — measure the resistance in the leads or calculate a value — enter the value as a compensation for long leads for the applicable channels (channels using Pt100 sensors). • If the pump is placed closer than 30 meters from the base unit no action is required. **Result:** The system is now ready to be used.	*Compensate for Measurement Error due to Long Leads* (in chapter *Settings with the Web Tool*)

Regain Access Code for Setup

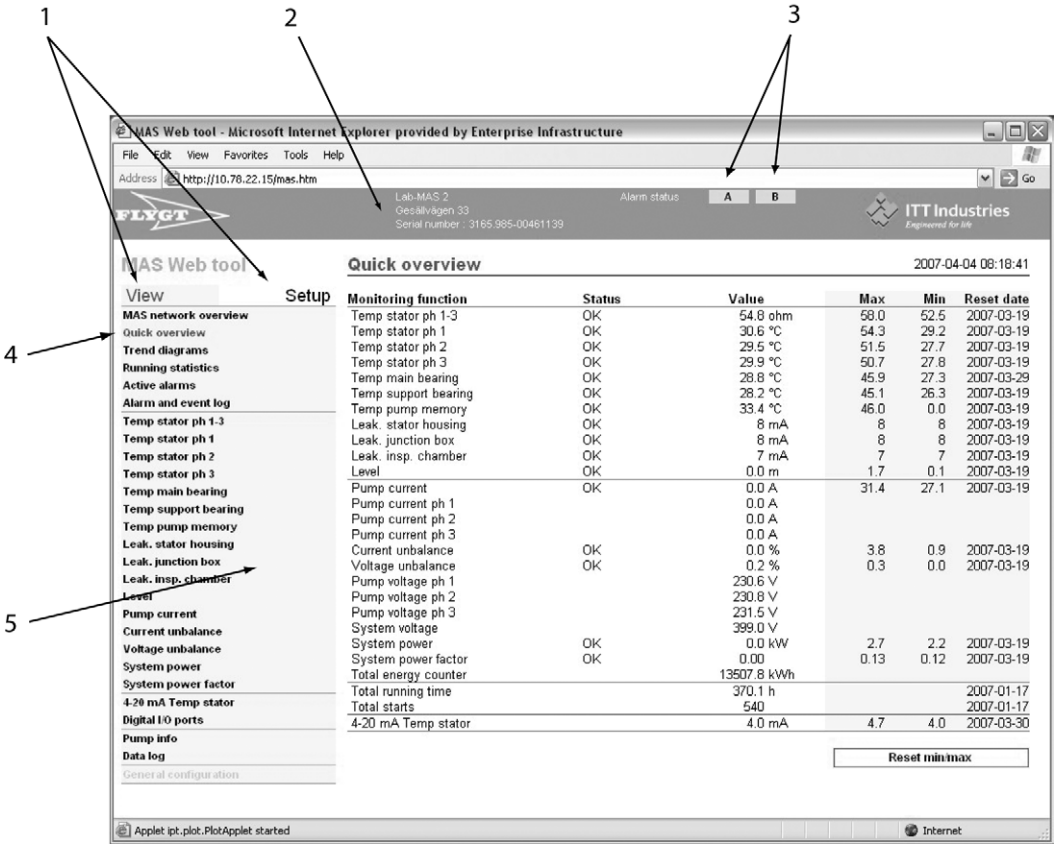
Most of the configuration menu windows under Setup require a password access code (default is 1234). If this code and the IP address are forgotten, special software and a procedure is required to regain access to the web tool.

Use the Web Tool

Web Tool Window

Illustration

This illustration shows the web tool window.


1
2
3
4
5
MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Address http://10.78.22.15/mas.htm
Go
FLYGT
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status
A
B
ITT Industries
Engineered for life
MAS Web tool
View
Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Level
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
4-20 mA Temp stator
Digital I/O ports
Pump info
Data log
General configuration
Quick overview
2007-04-04 08:18:41
Monitoring function | Status | Value | Max | Min | Reset date
Temp stator ph 1-3 | OK | 54.8 ohm | 58.0 | 52.5 | 2007-03-19
Temp stator ph 1 | OK | 30.6 °C | 54.3 | 29.2 | 2007-03-19
Temp stator ph 2 | OK | 29.5 °C | 51.5 | 27.7 | 2007-03-19
Temp stator ph 3 | OK | 29.9 °C | 50.7 | 27.8 | 2007-03-19
Temp main bearing | OK | 28.8 °C | 45.9 | 27.3 | 2007-03-29
Temp support bearing | OK | 28.2 °C | 45.1 | 26.3 | 2007-03-19
Temp pump memory | OK | 33.4 °C | 46.0 | 0.0 | 2007-03-19
Leak. stator housing | OK | 8 mA | 8 | 8 | 2007-03-19
Leak. junction box | OK | 8 mA | 8 | 8 | 2007-03-19
Leak. insp. chamber | OK | 7 mA | 7 | 7 | 2007-03-19
Level | OK | 0.0 m | 1.7 | 0.1 | 2007-03-19
Pump current | OK | 0.0 A | 31.4 | 27.1 | 2007-03-19
Pump current ph 1 | | 0.0 A
Pump current ph 2 | | 0.0 A
Pump current ph 3 | | 0.0 A
Current unbalance | OK | 0.0 % | 3.8 | 0.9 | 2007-03-19
Voltage unbalance | OK | 0.2 % | 0.3 | 0.0 | 2007-03-19
Pump voltage ph 1 | | 230.6 V
Pump voltage ph 2 | | 230.8 V
Pump voltage ph 3 | | 231.5 V
System voltage | | 399.0 V
System power | OK | 0.0 kW | 2.7 | 2.2 | 2007-03-19
System power factor | OK | 0.00 | 0.13 | 0.12 | 2007-03-19
Total energy counter | | 13507.8 kWh
Total running time | | 370.1 h | | | 2007-01-17
Total starts | | 540 | | | 2007-01-17
4-20 mA Temp stator | | 4.0 mA | 4.7 | 4.0 | 2007-03-30
Reset min/max
Applet ipt.plot.PlotApplet started
Internet

Window Description

This table describes the main sections of the web tool window:

Number	Description
1	Mode selection, View or Setup
2	General information: Pump station name and address, pump type and serial number
3	Alarm indication (A or B level)
4	Function selection (Quick overview in View mode in this example)
5	Side bar menu. Available functions depend on selected mode, View or Setup.

Two Basic Modes

The web tool has two basic modes of operation, View and Setup:

- View is used to get a general picture of the pump status, alarm handling and for analysis of measurement results.
- Setup is used to set up monitoring channels, communication ports and service request. It is also used to manage logged data (backup, deletion, export).

Access Levels and Default Password

There are two access levels determining the scope of possible actions for the user. Access level is determined at login and is entered as User name.

- User name Config gives access to all setting and viewing possibilities.
- User name Operator offers all viewing possibilities but limited access to settings.

Default password

The default password for

- Config is ef56
- Operator is cd34.

Access Level Operator Limitations

Although all settings can be seen (in grey) when logged in as operator, the ability to change settings are limited, for example:

- Settings in Setup mode.
- Global Reset of min/max values (in the Quick overview window). Individual reset per channel is possible.
- Reset of counters.

Instruction

Follow these steps to use the web tool:

Step	Action	Result
1	Click Login.	The Login box is opened.
2	Enter user name (operator or config) and password (default is cd34 or ef56) in the web tool login box and click OK.	
3	Click View or Setup to select mode.	
4	Click a function/channel in the main (left) menu.	The selected web page is displayed.

Refresh Web Pages or Reload Web Tool

The web pages may load incorrectly and may have to be refreshed. Choose one of the following options to refresh the web pages or reload the web tool:

- Right-click the actual frame of the page to update and select Refresh *or*
- Press function key F5 to reload the web tool. This has to be done to put in effect settings such as changes to the sidebar text or general information text at the top (blue field).

Use the Operator Panel

Overview

Table of Contents

This chapter contains the following topics:

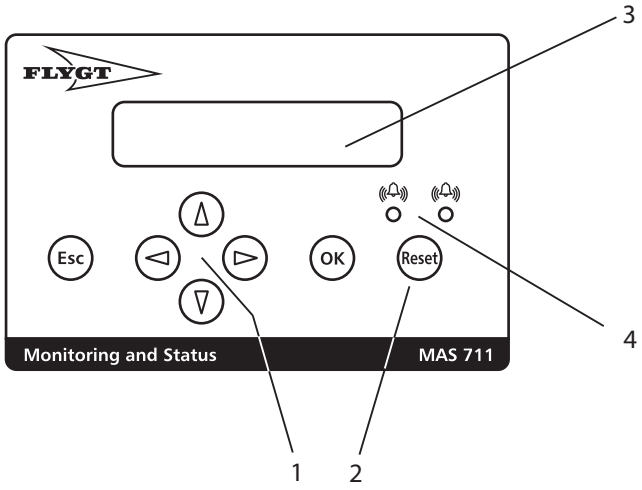
Topic	
Browse the Menus	60
Menu System	63

Browse the Menus

Operator Panel

Illustration

This is an illustration of the operator panel:



Panel description

This table gives an overview of the main parts of the operator panel:

Part	Name	Description
1	Menu navigation buttons (including Esc and OK)	Used to navigate through the menu system.
2	Alarm reset button	Used to acknowledge alarms and events
3	Display	Displays control parameters and alarms. Maximum 2 rows x 20 characters.
4	Alarm indication LED:s	Displays A-alarm (red) and B-alarm (yellow).

Instruction

This table shows how to browse the menus:

If you want to ...	then press ...
• select base menu information *or* • move the cursor to the left	
• select extended menu information *or* • move the cursor to the right	

If you want to ...	then press ...
• advance one menu *or* • decrease a value *or* • advance among a set of alternative parameters	
• move backwards one menu *or* • increase a value *or* • move back among a set of alternative parameters	
• select next menu level *or* • enter edit mode *or* • acknowledge	
• exit present menu level *or* • exit edit mode	
acknowledge alarms and events	

Display Text, Icons and Messages

Menu text and menu value

Menu text is usually placed on the first display row and menu value on the second row.

Display icons and messages

This table shows display icons and messages and their meaning:

Icon/Message	Meaning
"..." in the lower right corner of the display	Sub menus are available
An arrow in the lower right corner of the display	Extended information (on the same menu level) is available
A value is flashing	The value can be edited

Display Information

At startup

At startup, two windows are displayed sequentially, showing

1. version of the operator panel program
2. version of firmware (basic base unit program).

At keystroke time-out

If no keys are pressed in 5 minutes, the display goes into automatic mode, showing
- pump current (if the pump is on and a current transducer is fitted) *or*
- accumulated running time (if the pump is off).

When an Alarm is Detected

When an alarm condition is detected the display shows the event log, which is a list of present and previous alarms and events.

Menu System

Setup and View

The main menu structure is divided into two major branches, Setup and View, in analogy with the operating modes of the web tool.

Navigation Help

A menu navigation help can be activated from the Setup menu. Whenever a button is pressed, the menu number is displayed briefly in the display, showing the present position in the menu system (see below).

View Menu

As a general rule, only channels enabled in the Setup menu are shown in the View menu. In the following description, the menu numbers refer to the position in the menu system. Provided that the navigation help is activated, the menu number is shown briefly in the display as reference.

This table shows an overview of the View menu system:

Menu number	Menu name/Description
1.1	**Event log (and alarm log)**
1.1.1	Alarm and event item no. 1
↓	
1.1.100	Alarm and event last item (max 100 items)
1.2	**Dataplate info**
1.2.1	Pump data plate data (serial number ...)
↓	
1.2.20	Pump data plate last item (max 20 items)
1.3	**Pump total runtime**
1.3.1	Pump trip runtime – present value
1.3.1.1	Reset of trip runtime counter (value, date and time is recorded in a list of reset occasions)
1.3.2	Pump trip runtime recording (reset occasion 1)
↓	
1.3.10	Pump trip runtime last recording (max 10 reset occasions)
1.4	**Pump total starts**
1.4.1	Pump trip starts – present value
1.4.1.1	Reset of trip starts counter (value, date and time is recorded in a list of reset occasions)
1.4.2	Pump trip starts recording (reset occasion 1)
↓	
1.4.10	Pump trip starts last recording (max 10 reset occasions)
1.5	**Pump start and stop**

Menu number	Menu name/Description
1.5.1	Pump start recording no. 1 (date and time) → Pump stop recording no. 1 (date and time)
↓	
1.5.50	Pump start last recording → Pump stop last recording (max 50)
1.6	**Temp stator ph 1-3 (Status) (Thermal switch/Thermistor ohm reading)**
1.6.1	Value
1.6.2	Min
1.6.2.1	Reset of min
1.6.3	Max
1.6.3.1	Reset of max
1.7	**Temp stator ph 1 – Temp or ohm reading (Pt100/Thermal switch/Thermistor)**
1.7.1	Status
1.7.2	Min
1.7.2.1	Reset of min
1.7.3	Max
1.7.3.1	Reset of max
1.8	**Temp stator ph 2 – Temp or ohm reading (Pt100/Thermal switch/Thermistor)** Same menu structure as Temp stator ph 1
1.9	**Temp stator ph 3 – Temp or ohm reading (Pt100/Thermal switch/Thermistor)** Same menu structure as Temp stator ph 1
1.10	**Temp main bearing – Temperature reading (Pt100)** Same menu structure as Temp stator ph 1
1.11	**Temp support bearing – Temperature reading (Pt100)** Same menu structure as Temp stator ph 1
1.12	**Temp pump memory – Temperature reading** Same menu structure as Temp stator ph 1
1.13	**Leakage stator house - Status** Same menu structure as Temp stator ph 1
1.14	**Leakage junction box - Status** Same menu structure as Temp stator ph 1
1.15	**Leakage water in oil/Leakage inspection chamber - Status** Same menu structure as Temp stator ph 1
1.16	**Vibration (etc.) – Reading** Same menu structure as Temp stator ph 1

Menu number	Menu name/Description
1.17	**Pump current** Same menu structure as Temp stator ph 1
1.18	**Power analyzer channel 1 - Reading** Same menu structure as Temp stator ph 1
1.19	**Power analyzer channel 2 - Reading** Same menu structure as Temp stator ph 1
1.20	**Power analyzer channel 3 - Reading** Same menu structure as Temp stator ph 1
1.21	**Power analyzer channel 4 - Reading** Same menu structure as Temp stator ph 1
1.22	**Analog output – Reading 4 -20 mA (Temperature/Vibration)** Same menu structure as Temp stator ph 1
1.23	**Digital I/O ports**
1.23.1	RUN input - Status
1.23.2	RESET input - Status
1.23.3	A-ALARM relay output - Status
1.23.4	B-ALARM relay output - Status
1.23.5	GO relay output, pump interlock - Status
1.24	**Power analyzer**
1.24.1	Voltage ph 1 – Reading in V
1.24.2	Voltage ph 2 – Reading in V
1.24.3	Voltage ph 3 – Reading in V
1.24.4	Current ph 1 – Reading in A
1.24.5	Current ph 2 – Reading in A
1.24.6	Current ph 3 – Reading in A
1.24.7	Pump current mean – Reading in A
1.24.8	System voltage – Reading in V
1.24.9	System power – Reading in kW
1.24.10	System power factor – Reading
1.24.11	Total energy – Reading in kwh

Setup Menu

This table shows an overview of the Setup menu system:

Menu number	Menu name/Description
2.1	**Language**
2.1.1	English/Lang 2/Lang 3/Lang 4/Lang 5

Menu number	Menu name/Description
2.2	**Menu navigation**
2.2.1	Active/Inactive
2.3	**Login**
2.3.1	Enter code (default is 1234). The following menus (2.4 — 2.23) require correct password code.
2.4	**Change password**
2.4.1	Enter new code using arrow keys.
2.5	**General config**
2.5.1	Clock
2.5.1.1	Clock setting
2.5.2	Service interval
2.5.2.1	At number of starts
2.5.2.1.1	Service every (number of starts)
2.5.2.1.2	Present reading (number of starts)
2.5.2.1.3	Next service at (number of starts)
2.5.2.1.4	Service function activation. **Note!** Must be activated for function to work.
2.5.2.2	At running time
2.5.2.2.1	Service every (running time, hours)
2.5.2.2.2	Present reading (running time, hours)
2.5.2.2.3	Next service at (running time, hours)
2.5.2.2.4	Service function activation. **Note!** Must be activated for function to work.
2.5.2.3	At date
2.5.2.3.1	Next service at (date)
2.5.2.3.2	Service function activation. **Note!** Must be activated for function to work.
2.5.3	Temperature unit
2.5.3.1	°F/°C
2.5.4	MAS Id
2.5.4.1	MAS Id setting
2.5.5	Pump memory
2.5.5.1	Active/Inactive
2.5.6	Pump memory sync
2.5.6.1	Copy all from PM to MAS
2.5.6.2	Copy all from MAS to PM
2.5.7	Operator panel
2.5.7.1	Active/Inactive
2.5.8	Power analyzer (Ext 2)
2.5.8.1	Active/Inactive

Menu number	Menu name/Description
2.5.9	Power analyzer baudrate
2.5.9.1	19200/9600 baud
2.5.10	Power analyzer Id
2.5.10.1	Setting: 1-255
2.5.11	Power analyzer type
2.5.11.1	PAN 311/PAN312/WM14 (Ext 2)
2.5.11.2	WM22 (Ext 2)
2.5.12	Higher level ctrl (controller) (Ext 1)
2.5.12.1	Active/Inactive
2.5.13	Higher level ctrl baudrate
2.5.13.1	19200/9600 baud
2.5.14	MAS modbus id
2.5.14.1	Setting: 1-247
2.5.15	Ethernet DHCP
2.5.15.1	Active/Inactive
2.5.16	Ethernet IP address
2.5.16.1	Enter number: xxx.xxx.xxx.xxx
2.5.17	Ethernet IP netmask
2.5.17.1	Enter number: xxx.xxx.xxx.xxx
2.5.18	Ethernet gateway
2.5.18.1	Enter number: xxx.xxx.xxx.xxx
2.5.19	Ethernet DNS server 1
2.5.19.1	Enter number: xxx.xxx.xxx.xxx
2.5.20	Ethernet DNS server 2
2.5.20.1	Enter number: xxx.xxx.xxx.xxx
2.5.21	Ethernet DNS server 3
2.5.21.1	Enter number: xxx.xxx.xxx.xxx
2.5.22	Version numbers for: • Bootloader • Firmware • Web pages 1 • Web pages 2 • Web pages 3 • Web pages 4 • Web pages 5
2.6	**Temp stator ph 1-3** **Note!** All options are not applicable to all the channels below. For this reason not all positions in the respective menu tree branch are used for all channels.
2.6.1	Sensor
2.6.1.1	Thermistor/Thermal switch/None

Menu number	Menu name/Description
2.6.2	Alarm limits
2.6.2.2	Very high (R > 750 ohm)/Very high (R > 3000 ohm)
2.6.2.6	Short circuit (R < 20 ohm)
2.6.3	Alarm action priority
2.6.3.2	Very high (Warning/Pump stop/Off)
2.6.3.6	Short circuit (Warning/Pump stop/Off)
2.6.4	Alarm reset option
2.6.4.2	Very high (Manual/Automatic)
2.6.4.6	Short circuit (Manual/Automatic)
2.6.5	Alarm delay
2.6.5.2	Very high (0 - 30s)
2.6.5.6	Short circuit (0 – 30s)
2.7	**Temp stator ph 1**
2.7.1	Sensor
2.7.1.1	Pt100//None
2.7.2	Alarm limits
2.7.2.1	Broken circuit (R > 250 ohm)
2.7.2.2	Very high (T > x°)
2.7.2.2.1	Setting of alarm limit
2.7.2.3	High (T > y°)
2.7.2.3.1	Setting of alarm limit
2.7.2.6	Short circuit (R < 60 ohm)
2.7.3	Alarm action priority
2.7.3.1	Broken circuit (Warning/Pump stop/Off)
2.7.3.2	Very high (Warning/Pump stop/Off)
2.7.3.3	High (Warning/Pump stop/Off)
2.7.3.6	Short circuit (Warning/Pump stop/Off)
2.7.4	Alarm reset option
2.7.4.1	Broken circuit (Manual/Automatic)
2.7.4.2	Very high (Manual/Automatic)
2.7.4.3	High (Manual/Automatic)
2.7.4.6	Short circuit (Manual/Automatic)
2.7.5	Alarm delay
2.7.5.1	Broken circuit (0 - 30s)
2.7.5.2	Very high (0 - 30s)
2.7.5.3	High (0 - 30s)
2.7.5.6	Short circuit (0 – 30s)
2.7.6	Compensation for long wires (value in ohm)

Menu number	Menu name/Description
2.8	**Temp stator ph 2** Same structure as for Temp stator ph1 (2.7) above
2.9	**Temp stator ph 3** Same structure as for Temp stator ph1 (2.7) above
2.10	**Temp main bearing** Same structure as for Temp stator ph1 (2.7) above
2.11	**Temp support bearing** Same structure as for Temp stator ph1 (2.7) above
2.12	**Temp pump memory**
2.12.1	Input source
2.12.1.1	Temp pump memory (NTC thermistor)/None
2.12.2	Alarm limits
2.12.2.2	Very high (T > x°)
2.12.2.2.1	Setting of alarm limit
2.12.2.3	High (T > y°)
2.12.2.3.1	Setting of alarm limit
2.12.3	Alarm action priority
2.12.3.2	Very high (Warning/Pump stop/Off)
2.12.3.3	High (Warning/Pump stop/Off)
2.12.4	Alarm reset option
2.12.4.2	Very high (Manual/Automatic)
2.12.4.3	High (Manual/Automatic)
2.12.5	Alarm delay
2.12.5.1	Broken circuit (0 - 30s)
2.12.5.2	Very high (0 - 30s)
2.12.5.3	High (0 - 30s)
2.13	**Leakage stator housing**
2.13.1	Sensor
2.13.1.1	FLS/FLS10/FLS20/None
2.13.2	Alarm limits
2.13.2.1	Short circuit (I > 55 mA)
2.13.2.2	Leakage (I > 22 mA)
2.13.2.6	Broken circuit (I < 3 mA)
2.13.3	Alarm action priority
2.13.3.1	Short circuit (Warning/Pump stop/Off)
2.13.3.2	Leakage (Warning/Pump stop/Off)
2.13.3.6	Broken circuit (Warning/Pump stop/Off)
2.13.4	Alarm reset option

Menu number	Menu name/Description
2.13.4.1	Short circuit (Manual/Automatic)
2.13.4.2	Leakage (Manual/Automatic)
2.13.4.6	Broken circuit (Manual/Automatic)
2.13.5	Alarm delay
2.13.5.1	Short circuit (0 - 30s)
2.13.5.2	Leakage (0 - 30s)
2.13.5.6	Broken circuit (0 – 30s)
2.14	**Leakage junction box** Same structure as for Leakage stator housing (2.13) above
2.15	**Leakage inspection chamber/Leakage oil housing (Water in oil)**
2.15.1	Input source (sensor)
2.15.1.1	CLS (Water in oil)/FLS10 (Insp. chamber) **Note!** If you select • CLS, the channel name is set to Leak water in oil • FLS10 the channel name is set to Leak. insp. chamber
2.15.2	Same structure as for Leakage stator housing (2.13) above
↓	
2.15.5.6	Same structure as for Leakage stator housing (2.13) above
2.16	**Vibration** **Note:** Name can be changed. The vibration monitoring channel can be configured for an optional sensor with 4-20 mA output.
2.16.1	Input source
2.16.1.1	4-20 mA/None
2.16.2	Alarm limits
2.16.2.1	Short circuit (I > 22 mA)
2.16.2.2	Very high (Vib > x mm/s) **Note:** Unit can be changed
2.16.2.3	High (Vib > y mm/s)
2.16.2.4	Low (Vib < z mm/s)
2.16.2.5	Very low (Vib < p mm/s)
2.16.2.6	Broken circuit (I < 2 mA)
2.16.3	Action priority
2.16.3.1	Short circuit (Warning/Pump stop/Off)
2.16.3.2	Very high (Warning/Pump stop/Off)
2.16.3.3	High (Warning/Pump stop/Off)
2.16.3.4	Low (Warning/Pump stop/Off)
2.16.3.5	Very low (Warning/Pump stop/Off)
2.16.3.6	Broken circuit (Warning/Pump stop/Off)
2.16.4	Alarm reset option

Menu number	Menu name/Description
2.16.4.1	Short circuit (Manual/Automatic)
2.16.4.2	Very high (Manual/Automatic)
2.16.4.3	High (Manual/Automatic)
2.16.4.4	Low (Manual/Automatic)
2.16.4.5	Very low(Manual/Automatic)
2.16.4.6	Broken circuit (Manual/Automatic)
2.16.5	Alarm delay
2.16.5.1	Short circuit (0 - 30s)
2.16.5.2	Very high (0 - 30s)
2.16.5.3	High (0 - 30s)
2.16.5.4	Low (0 - 30s)
2.16.5.5	Very low (0 - 30s)
2.16.5.6	Broken circuit (0 - 30s)
2.16.6	Name
2.16.6.1	Edit name
2.16.7	Unit
2.16.7.1	Edit unit
2.16.8	Min 4 mA (Scaling: 4 mA corresponds to xxx.xxx – Enter value)
2.16.9	Max 20 mA (Scaling: 20 mA corresponds to yyy.yyy – (Enter value)
2.17	**Pump current**
2.17.1	Input source
2.17.1.1	Run input (MAS)/Current (Power an.)/Current input (MAS)/None
2.17.2	Alarm limits
2.17.2.2	Very high
2.17.2.2.1	Setting of alarm limit
2.17.2.3	High
2.17.2.3.1	Setting of alarm limit
2.17.2.4	Low
2.17.2.4.1	Setting of alarm limit
2.17.2.5	Very low
2.17.2.5.1	Setting of alarm limit
2.17.3	Action priority
2.17.3.2	Very high (Warning/Pump stop/Off)
2.17.3.3	High (Warning/Pump stop/Off)
2.17.3.4	Low (Warning/Pump stop/Off)
2.17.3.5	Very low (Warning/Pump stop/Off)
2.17.4	Alarm reset option
2.17.4.2	Very high (Manual/Automatic)
2.17.4.3	High (Manual/Automatic)

Menu number	Menu name/Description
2.17.4.4	Low (Manual/Automatic)
2.17.4.5	Very low (Manual/Automatic)
2.17.5	Alarm delay
2.17.5.2	Very high (0-30 s)
2.17.5.3	High (0-30 s)
2.17.5.4	Low (0-30 s)
2.17.5.5	Very low (0-30 s)
2.17.7	Transformer rating (primary current)
2.18	**System power**
2.18.1	Input source
2.18.1.1	System power/None
2.18.2	Alarm limits
2.18.2.2	Very high (P > x kW)
2.18.2.2.1	Setting of alarm limit
2.18.2.3	High (P > y kW)
2.18.2.3.1	Setting of alarm limit
2.18.2.4	Low (P > z kW)
2.18.2.4.1	Setting of alarm limit
2.18.2.5	Very low (P > p kW)
2.18.2.5.1	Setting of alarm limit
2.18.3	Alarm action priority
2.18.3.2	Very high (Warning/Pump stop/Off)
2.18.3.3	High (Warning/Pump stop/Off)
2.18.3.4	Low (Warning/Pump stop/Off)
2.18.3.5	Very low (Warning/Pump stop/Off)
2.18.4	Alarm reset option
2.18.4.2	Very high (Manual/Automatic)
2.18.4.3	High (Manual/Automatic)
2.18.4.4	Low (Manual/Automatic)
2.18.4.5	Very low (Manual/Automatic)
2.18.5	Alarm delay
2.18.5.1	Very high (0 - 30s)
2.18.5.2	High (0 - 30s)
2.18.5.3	Low (0 - 30s)
2.18.5.4	Very low (0 - 30s)
2.19	**Voltage unbalance**
2.19.1	Input source
2.19.1.1	System voltage/Voltage unbalance/None

Menu number	Menu name/Description
2.19.2	Alarm limits
2.19.2.2	Very high (P > x kW)
2.19.2.2.1	Setting of alarm limit
2.19.2.3	High (P > y kW)
2.19.2.3.1	Setting of alarm limit
2.19.3	Alarm action priority
2.19.3.2	Very high (Warning/Pump stop/Off)
2.19.3.3	High (Warning/Pump stop/Off)
2.19.4	Alarm reset option
2.19.4.2	Very high (Manual/Automatic)
2.19.4.3	High (Manual/Automatic)
2.19.5	Alarm delay
2.19.5.1	Very high (0 - 30s)
2.19.5.2	High (0 - 30s)
2.20	**Current unbalance** Same menu structure as for Voltage unbalance (2.19) above
2.21	**System power factor** Same menu structure as for Voltage unbalance (2.19) above
2.22	**Output 4-20 mA (Default: Vibration)**
2.22.1	Input source (Vibration/Temp support bearing/Temp main bearing/Temp stator ph 3/Temp stator ph 2/Temp stator ph 1/Temp stator max ph 1-3/None
2.22.6	Name
2.22.6.1	Edit name
2.22.7	Min 4 mA (Scaling: 4 mA corresponds to xxx.xxx – Enter value)
2.22.8	Max 20 mA (Scaling: 20 mA corresponds to xxx.xxx – Enter value)
2.23	**Digital I/O ports**
2.23.1	Run-input – Make (active)/Break (active)
2.23.2	Reset-input – Make (active)/Break (active)
2.23.3	A-alarm relay output – Make (active)/Break (active)
2.23.4	B-alarm relay output – Make (active)/Break (active)
2.23.5	Pump interlock output relay (GO-contact) – Break (active)

Part of Setup Menu Available Without Login

Only a very limited part of the Setup menu is available without login. In the following description, the menu numbers refer to the position in the menu system.

This table shows the part of the Setup menu system that is available without login:

Menu number	Menu name
2.1	**Language**
2.1.1	English/Lang 2/Lang 3/Lang 4/Lang 5
2.2	**Menu navigation**
2.2.1	Active/Inactive
2.3	**Login**
2.3.1	Enter code (default is 1234). The following menus (2.4 — 2.23) require correct password code.

Settings with the Web Tool

Overview

Table of Contents

This chapter contains the following topics:

Topic

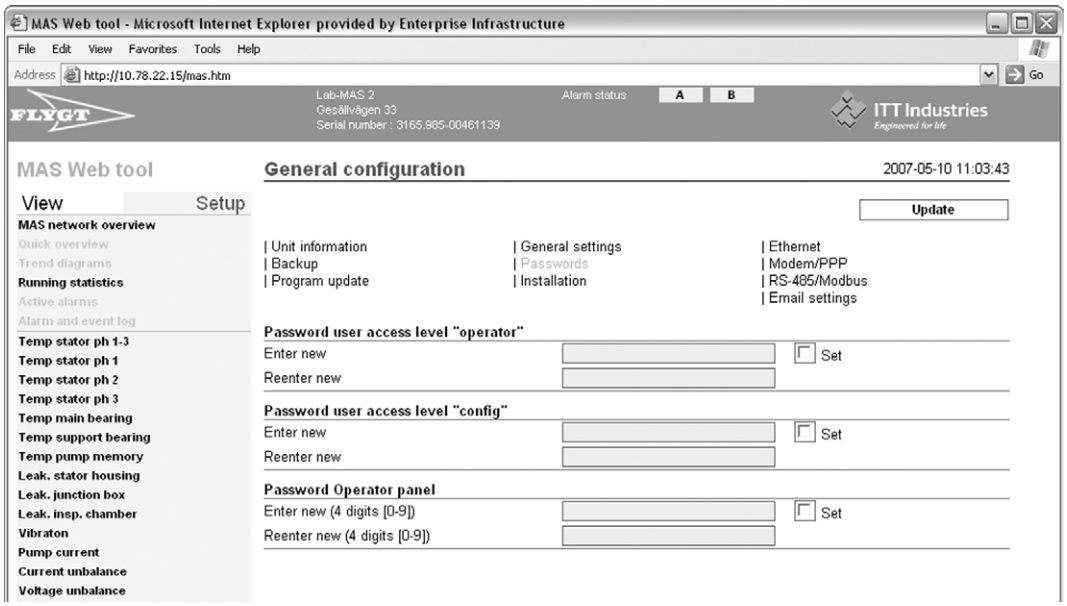
Change Password 76
Change the Display Language 77
Set Unit Information..... 79
Configure Communication (RS-485, Modbus) 80
Make a Manual Setting of a Monitoring Channel 82
Record Running Time and Number of Starts 84
Compensate for Measurement Error due to Long Leads 86
Update the Internal Program 90
Set Reload Time for Alarm and Quick Overview 92
Make Settings for Alarm Distribution through E-mail 93
Make Modem/PPP Settings 94
Set Up MAS Network Overview 96
Set Up MAS Relay Module 97

Change Password

Instruction

Follow these steps to change the password:

1. Log in at access level config (user name: config, default password: ef56).
   Comment: It is also possible to set the password for the operator panel (can also be done from the operator panel menu system). The default password for the operator panel is 1234.
2. Click Setup — General configuration — Passwords.
   Result: The Password window is opened.



3.

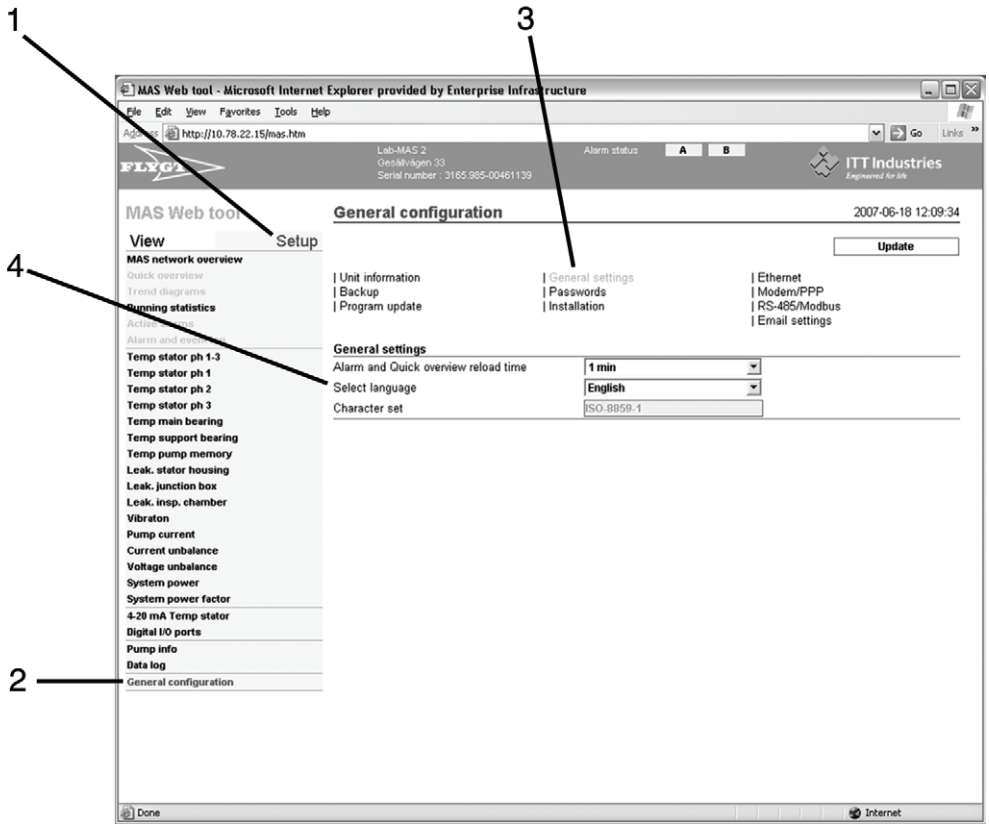
- Tick **Set** and enter the new password for operator, config or the operator panel.
- Confirm the new password by clicking Update.

Change the Display Language

Web tool menus

Illustration

This is an illustration of the web tool menus used in the instruction below:



Menu Description

This table describes the web tool menus used in the instruction below:

Menu number	Name
1	Setup
2	General configuration
3	General settings
4	Select language

Instruction

Follow these steps to change the display language:

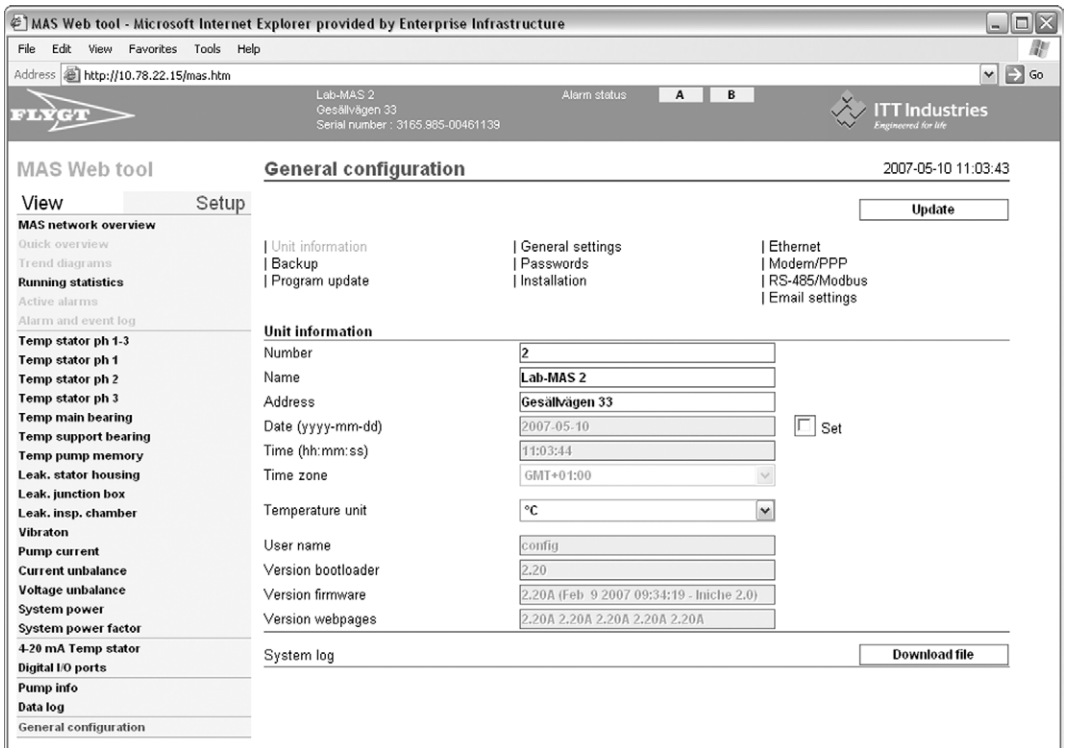
Step	Action
1	Click Setup (right tab of the side menu) – General configuration (menu option at the bottom of the side menu).
2	Click General settings (top menu option in the middle column of the centre menu).
3	Select the desired language in the Select language drop-down menu (bottom of the two drop-down menus).
4	Click Update (blue box at the top right hand of the window) and then press keyboard button F5 to display the new language.

Set Unit Information

Instruction

Follow these steps to set the time and temperature unit and enter pump station information (visible at the top of the web pages):

1. Click Setup – General configuration – Unit information.
   Result: The Unit information window is opened.



2. Tick **Set** (to enable setting of date, time and time zone).

3.
- Enter the name of the pump station in the text boxes (will appear at the top of the web pages).
- Enter the postal address of the pump station (also displayed at the top of the pages).
- If required, set the date, time, time zone and temperature unit.
  Note! Alarm limits are not automatically updated when the temperature unit is changed.

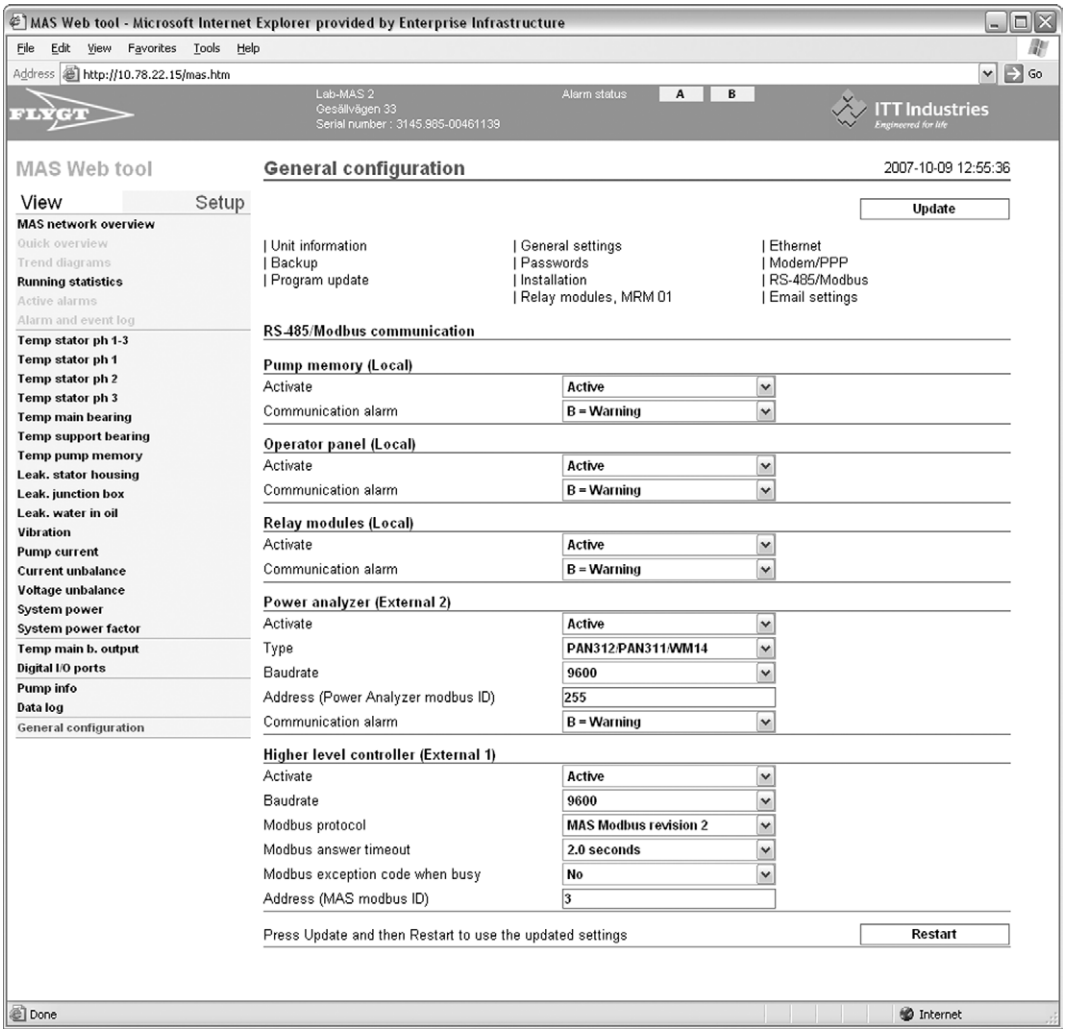
4.
- Click Update.
- Press F5 to view the changes of the text at the top of the pages (blue field).

Configure Communication (RS-485, Modbus)

Instruction

Follow these steps to switch the RS-485/Modbus communication on and off and to configure the communication:

1. Click Setup — General configuration — RS-485/Modbus.
   Result: The RS–485/Modbus communication window is opened.



2. Select **Active** or **Inactive** in the Activate drop-down menus to switch the communication on or off for the desired external unit.

3. **Pump memory/Operator panel/Relay module**

- Set the status of the communication alarm, if applicable.
- If a portable operator panel is used for temporary connection to one or several base units, switch off the operator panel communication alarm for these base units.

4. **Power analyzer**

- Select type **PAN 311/PAN312/WM14**.
- Set the baudrate and Modbus address to enable communication between the Power analyzer and the base unit. Default baudrate is 9600 and default address is 255. These default settings should be used if no changes are made to the default settings in the Power analyzer.
- Set the communication alarm status.
  Comment: A separate manual describes how to set parameters in the PAN311/PAN312/WM14 Power Analyzer (Power Analyzer PAN 311/PAN312 manual).

5. **Higher level controller**
   Contact your local service organization if you want to set up communication with a higher level controller (APP/FMC/PLC).
   Comment: The protocol (Modbus) used for communication over port Ext 1 to a Higher level controller (central system) has been upgraded to revision 3. The Modbus protocol is described in a separate document.
6. Click Update and then Restart to execute the settings. This may take a couple of minutes.

Make a Manual Setting of a Monitoring Channel

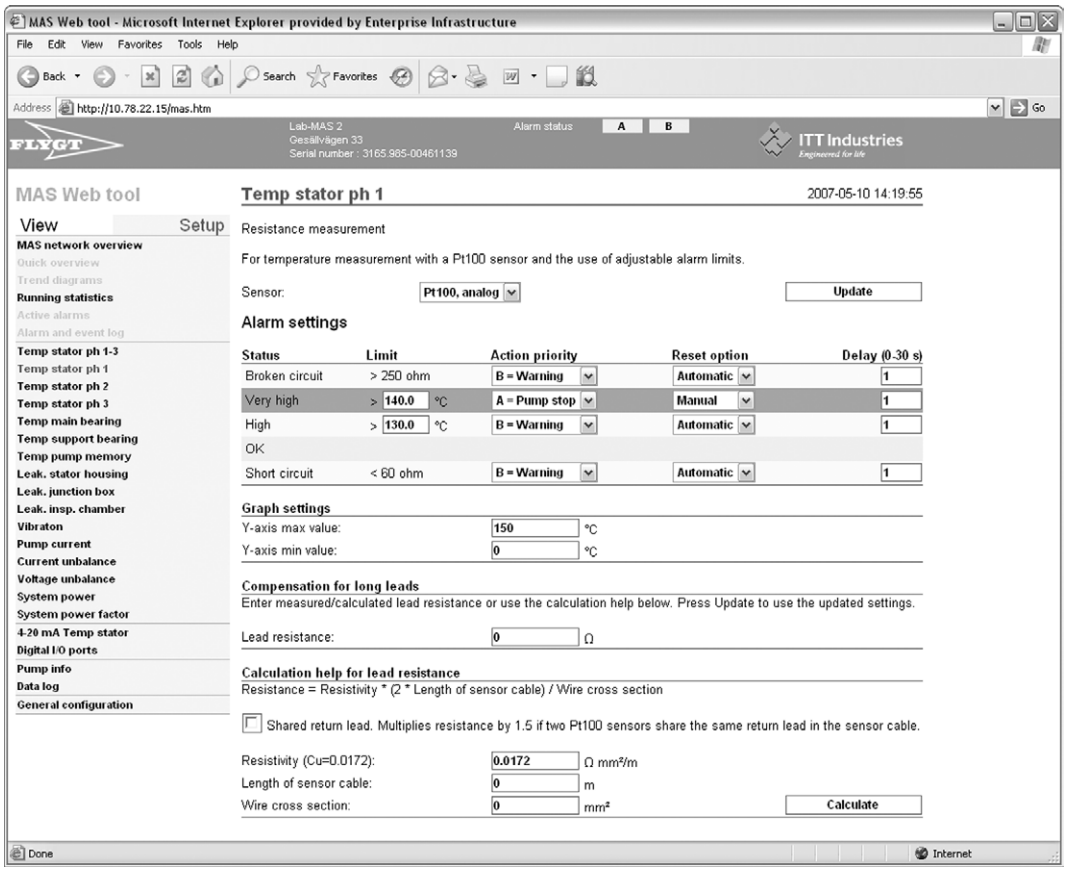
Instruction

Follow these steps to activate and make a manual setting of a channel (Temp stator ph 1 is an example):

1.

- Click Setup above the main (left) menu to enter setup mode.
- Click channel to setup (Temp stator ph 1).

  Result: The Temp stator ph 1 window is opened.


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Address http://10.78.22.15/mas.htm
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status A B
ITT Industries
MAS Web tool
View Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Vibraton
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
4-20 mA Temp stator
Digital I/O ports
Pump info
Data log
General configuration
Temp stator ph 1
2007-05-10 14:19:55
Resistance measurement
For temperature measurement with a Pt100 sensor and the use of adjustable alarm limits.
Sensor: Pt100, analog
Update
Alarm settings
Status Limit Action priority Reset option Delay (0-30 s)
Broken circuit > 250 ohm B = Warning Automatic 1
Very high > 140.0 °C A = Pump stop Manual 1
High > 130.0 °C B = Warning Automatic 1
OK
Short circuit < 60 ohm B = Warning Automatic 1
Graph settings
Y-axis max value: 150 °C
Y-axis min value: 0 °C
Compensation for long leads
Enter measured/calculated lead resistance or use the calculation help below. Press Update to use the updated settings.
Lead resistance: 0 Ω
Calculation help for lead resistance
Resistance = Resistivity * (2 * Length of sensor cable) / Wire cross section
Shared return lead. Multiplies resistance by 1.5 if two Pt100 sensors share the same return lead in the sensor cable.
Resistivity (Cu=0.0172): 0.0172 Ω mm²/m
Length of sensor cable: 0 m
Wire cross section: 0 mm²
Calculate
Done
Internet

Note! Rightclick and select Refresh to update the current page. Press F5 or click the Refresh button to restart the entire web tool.

2. Select sensor in the Sensor drop-down menu (Pt100 analog).

3.

- Enter alarm trip temperature for warning level High (130 °C) and for pump stop level Very high (140 °C) in the Alarm settings field.
- Select **Action priority** for each alarm level in the drop-down menus.

4.

- Select **Reset option**. A-alarms should be manually reset but B-alarms can be allowed to reset automatically.
- Enter alarm **Delay**. Use a short delay for Broken circuit and Short circuit to reveal glitches.

5. Set Y-axis max value in the Graph settings field to adjust the presentation of measurement results with graphs.

6. If the distance between the pump and the electrical cabinet is long (approximately >30 meters), enter a figure to compensate for the measurement error due to additional lead resistance in the Compensation for long leads field.

Reference: See section *Compensate for Measurement Error due to Long Leads*.

7. Click Update.

Record Running Time and Number of Starts

Conditions for Recording

Running time and number of starts are registered provided that either of the following conditions is fulfilled:

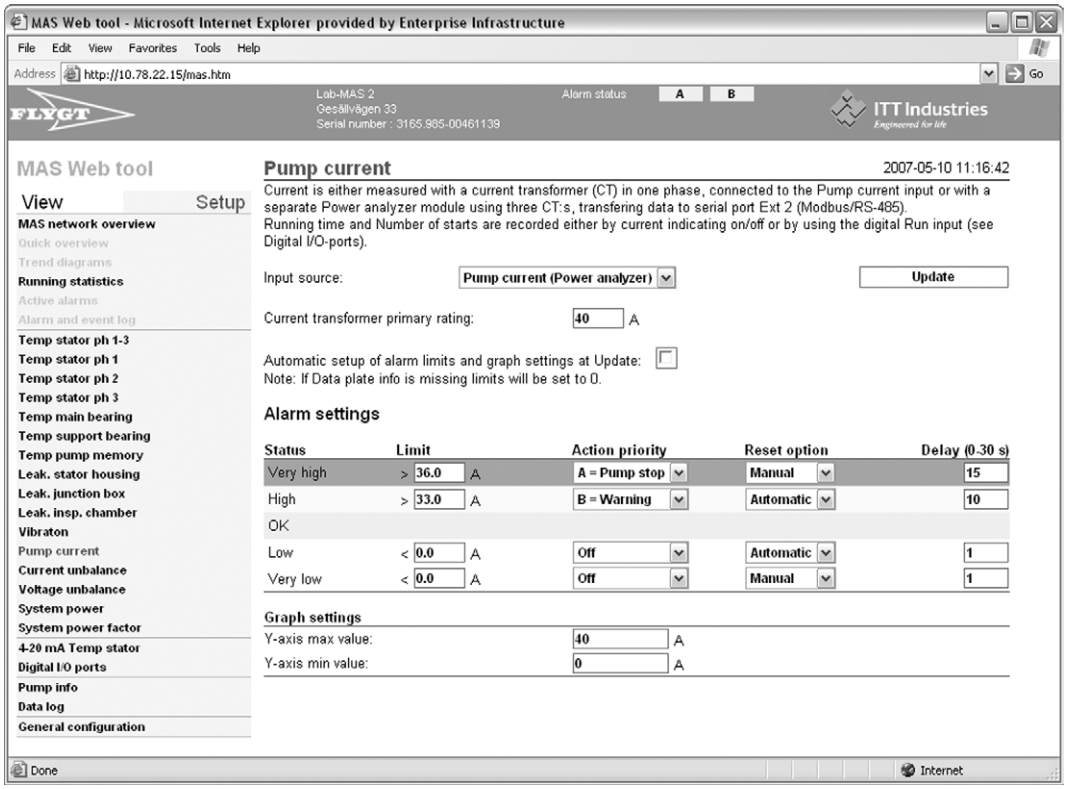
- Pump current is measured by means of a current transformer connected to terminals 11-12 *or*
- Pump current is measured by means of a Power analyzer (PAN 311/PAN312) *or*
- If pump current is not measured, a volt free contact, connected to the Run Digital input (terminals 23-24) is used to indicate pump on/off.

Note! If pump current is measured by means of a current transformer connected to terminals 11-12, make sure the transformer secondary rating is 1A AC.

Instruction

Follow these steps to enable recording of running time and number of starts:

1. Click Setup — Pump current.
   Result: The Pump current window is opened.



2. If you use
- a current transformer connected directly to the MAS base unit as input source, continue with step 3
- a Power analyzer as input source, continue with step 4
- run input as input source, continue with step 5.

3. **Current transformer**
- Select **Pump current input (MAS)** in the Input source drop-down menu.
- Enter the primary rating of the current transformer (used for calculation of a threshold level to determine whether the pump is on or off).

- Set the alarm limits manually or automatically. To set up the limits automatically, tick **Automatic setup of alarm limits and graph settings at Update**. This will set the alarm limits according to the data plate information.
- Click Update.
- **Result:** Recording of running time is enabled.

4. Power Analyzer

- Select **Pump current (Power Analyzer)** in the Input source drop-down menu.
- Set the alarm limits manually or automatically. To set up the limits automatically, tick **Automatic setup of alarm limits and graph settings at Update** and click Update. This will set the alarm limits according to the data plate information.
- Select and activate the other associated channels (Pump current, Current unbalance, Voltage unbalance/System voltage, System power, System power factor) in their respective Input source drop-down menu.
- Set the alarm limits for the other associated channels in the same way as pump current and click Update.
- **Result:** Recording of running time is enabled.

5. Run input (pump on/off)

- Select **Run input (MAS)** in the Input source drop-down menu and click Update.
- **Result:** Recording of number of starts is enabled.

Compensate for Measurement Error due to Long Leads

Wire Resistance

A Pt100 sensor changes resistance with temperature and thus the base unit can measure the resistance to calculate the temperature. The wiring from the system to the sensor and back adds resistance to the measurement and causes an error — the temperature value shown will be higher than the actual temperature. The longer and thinner the wires, the larger the error in the measurement.

The wire resistance is proportional to the wire length and inversely proportional to the cross section:

Resistance = Resistivity x (2 x Length of sensor cable) / Wire cross section

The resistivity of copper is 0.0172 $\Omega mm^2/m$.

Measurement Error Example

If the distance between the pump and the cabinet is 50 meters and the Subcab cable is used (1,5 mm^2 cross sectional area), the error in the temperature measurement will be:

- +4,5 °C (8,1°F) for Temp main bearing and Temp stator ph 1 (using a common return lead)
- +3 °C (5,4 °F) for Stator ph 2, Stator ph 3, Support bearing (using separate leads)

Note! The error is proportional to the distance so a distance of 100 meters doubles the error.

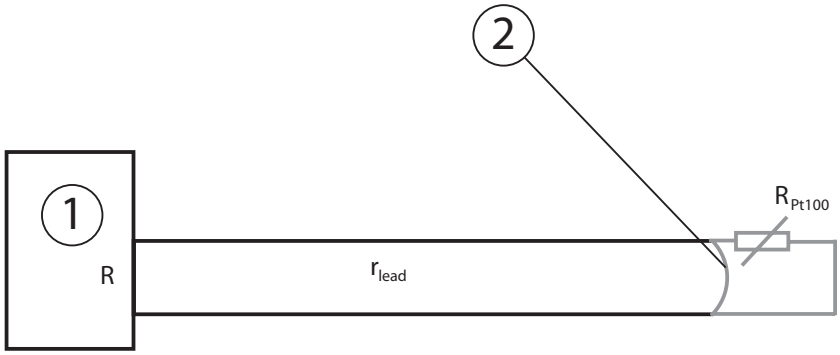
Compensation Method

The compensation method used is software compensation and does not require any additional leads. The software compensation method requires that the lead resistance is estimated (measured or calculated) and entered into the system. The system will then simply reduce the measured resistance values by the lead resistance prior to calculating the temperature.

Lead Resistance Measurement Method

Illustration

This is an illustration of the lead resistance measurement method:



Measurement tools

This table describes the main tools in the lead resistance measurement:

Number	Description
1	Multimeter.
2	Temporary jumper

Instruction

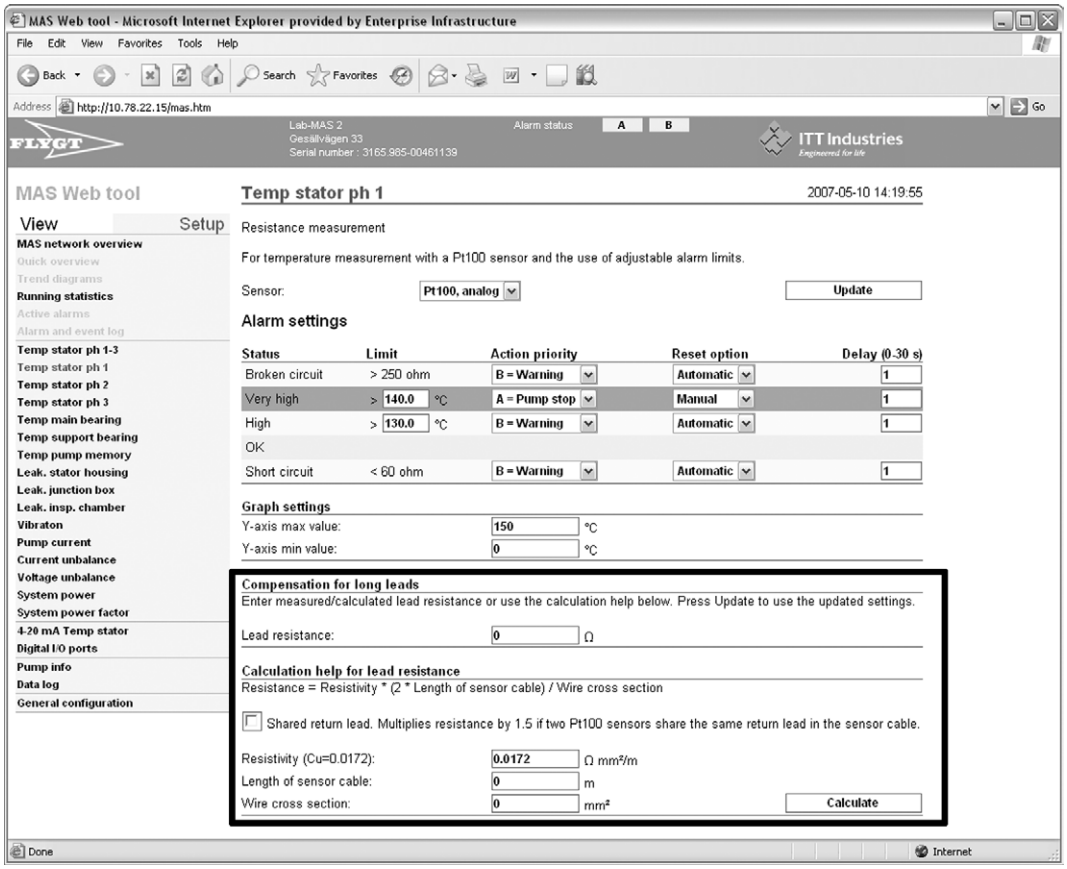
If the pump is placed at a distance from the base unit exceeding 30 meters, the resistance in the leads must be entered as a compensation. The resistance can be

- measured
- calculated by hand *or*
- calculated automatically.

Note! For the instructions below to apply, the Pt100 sensors should be wired in accordance with the instructions. Pt100 sensors to channels Temp main bearing and Temp stator ph 1 share a lead in the Subcab sensor cable. The other channels should preferably use separate leads.

Illustration

This is an illustration of the Temp stator ph 1 window (example) used in the instructions below:


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.78.22.15/mas.htm
Go
FLYGT
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status A B
ITT Industries
Engineered for life
MAS Web tool
View Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Vibraton
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
4-20 mA Temp stator
Digital I/O ports
Pump info
Data log
General configuration
Temp stator ph 1
2007-05-10 14:19:55
Resistance measurement
For temperature measurement with a Pt100 sensor and the use of adjustable alarm limits.
Sensor: Pt100, analog
Update
Alarm settings
Status Limit Action priority Reset option Delay (0-30 s)
Broken circuit > 250 ohm B = Warning Automatic 1
Very high > 140.0 °C A = Pump stop Manual 1
High > 130.0 °C B = Warning Automatic 1
OK
Short circuit < 60 ohm B = Warning Automatic 1
Graph settings
Y-axis max value: 150 °C
Y-axis min value: 0 °C
Compensation for long leads
Enter measured/calculated lead resistance or use the calculation help below. Press Update to use the updated settings.
Lead resistance: 0 Ω
Calculation help for lead resistance
Resistance = Resistivity * (2 * Length of sensor cable) / Wire cross section
Shared return lead. Multiplies resistance by 1.5 if two Pt100 sensors share the same return lead in the sensor cable.
Resistivity (Cu=0.0172): 0.0172 Ω mm²/m
Length of sensor cable: 0 m
Wire cross section: 0 mm²
Calculate
Done
Internet

Measure and compensate

Follow these steps to measure the resistance and compensate for measurement error due to long leads:

1. Measure the resistance by putting a jumper close to the Pt100 sensor to short circuit, and measure the lead resistance, r_{lead}, from the MAS end. See the illustration above.
2. Enter the measured resistance value in the Lead resistance field by using the
   - web tool (see illustration above) *or*
   - operator panel (use menu Compensation for long wires, 2.7.6).
3.
   - Click Update.
   - View the result in the (View–) Quick overview.

Calculate by hand and compensate

Follow these steps to calculate the resistance by hand and compensate for measurement error due to long leads:

1. Calculate the resistance by using the following formula: r_{lead} = Resistivity x (2 x Length of sensor cable) / Wire cross section.
2. Enter the calculated lead resistance value in the Lead resistance field by using the
   - web tool (see illustration above) *or*
   - the operator panel (menu Compensation for long wires, 2.7.6).
3. For sensors using a common return lead (wiring for Temp main bearing and Temp stator ph 1), enter a value corresponding to 1.5 x r_{lead}.
4.
   - Click Update.
   - View the result in the (View–) Quick overview.

Calculate automatically and compensate

Follow these steps to calculate the resistance automatically and compensate for measurement error due to long leads:

1. Calculate the resistance automatically by entering the resistivity, cable length and cross section area into the Calculation help field (in Setup – Temp stator ph1 for example).
2. For sensors using a common return lead (wiring for Temp main bearing and Temp stator ph 1), tick **Shared return lead**.
3. Click Calculate.
   Result: The calculated value is automatically entered in the Lead resistance field.
4.

- Click Update.
- View the result in the (View–) Quick overview.

Update the Internal Program

Three Program Parts

The internal program of the system is divided into three parts which can be updated separately:

- Bootloader is used for program loading and flash memory programming.
- Firmware is the system software including measuring functions, communication, web server etc.
- Web pages include the HTML and Java code for the web pages.

Upgrade File

The best way to update the program is to use a separate upgrade file containing all parts of the software. When using this file all parts of the software will be correctly updated to the latest version.

Note! Contact your local Flygt representative to obtain the latest upgrade file.

The file is typically named: MAS_A_upgrade_F224_W224_B220_071004.exe

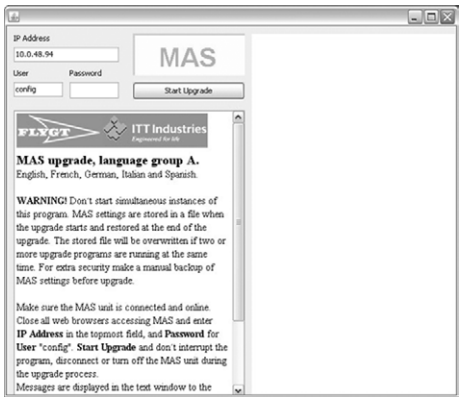
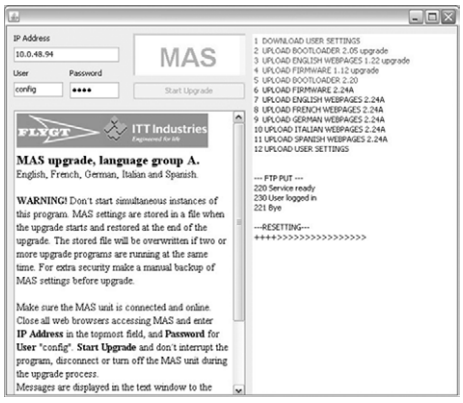
File name description

Item	Meaning
A	Language group (in this case group A: English, German, French, Spanish, Italian).
F224	Firmware version (in this case version 2.24).
W224	Web pages version (in this case version 2.24).
B224	Bootloader version (in this case version 2.24).
071004	Release date of the software version.

Instruction

Follow these steps to update the internal program using the separate upgrade file:

Step	Action	Result
1	Make sure that you have a connection between your computer and the base unit. If you can access the MAS web pages your connection is confirmed.	
2	Close all browser windows displaying the web pages.	

Step	Action	Result
3	Run the update program by double-clicking it.	
4	Follow the instruction in the program: • Make sure the unit is connected and online. • Close all web browsers accessing MAS. • Enter IP number in the topmost field (default is 10.0.48.94). • Enter password for "config" access level. (default is ef56) • Click Start Upgrade. **Note!** Do *not* interrupt the program, disconnect or turn off the unit during the upgrade process!	During the upgrade progress messages are displayed in the message field on the right. Each upgrade step is set green when completed and when the upgrade is finished the entire message field will turn green. The entire process will take approximately 15-30 minutes. 

Set Reload Time for Alarm and Quick Overview

Instruction

Follow these steps to set alarm and quick overview reload time:

Step	Action
1	Click Setup — General configuration — General settings.
2	Select desired reload time (interval to update measurement results and alarms presented on the Quick overview and Alarm and event log pages). Default is 1 minute.

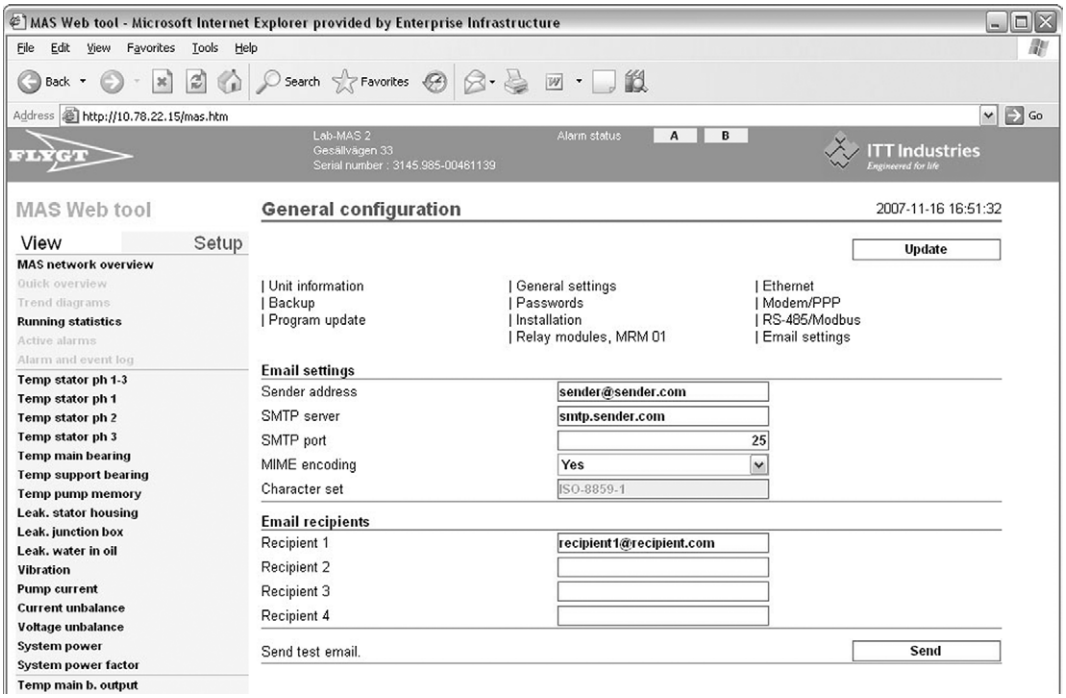
Make Settings for Alarm Distribution through E-mail

Instruction

Parameters for alarm distribution through email can be set.

Follow these steps to set up the email communication:

1. Click Setup – General configuration – Email settings.
   Result: The Email settings window is opened.



2.
- Enter a valid Sender address (will be shown as the “From” address).
- Enter the SMTP server name and the SMTP port number (25 by default) to use for sending the emails.
- Select if MIME encoding is to be used or not.

3.
- Enter up to four email recipients.
- Click Update.

  Note! If the unit is connected via a dial up modem connection, certain modem settings must be done to enable the unit to initiate a dial up connection for email sending. See section *Make Modem/PPP Settings*.

4. If desired, click Send to test the email function.

Make Modem/PPP Settings

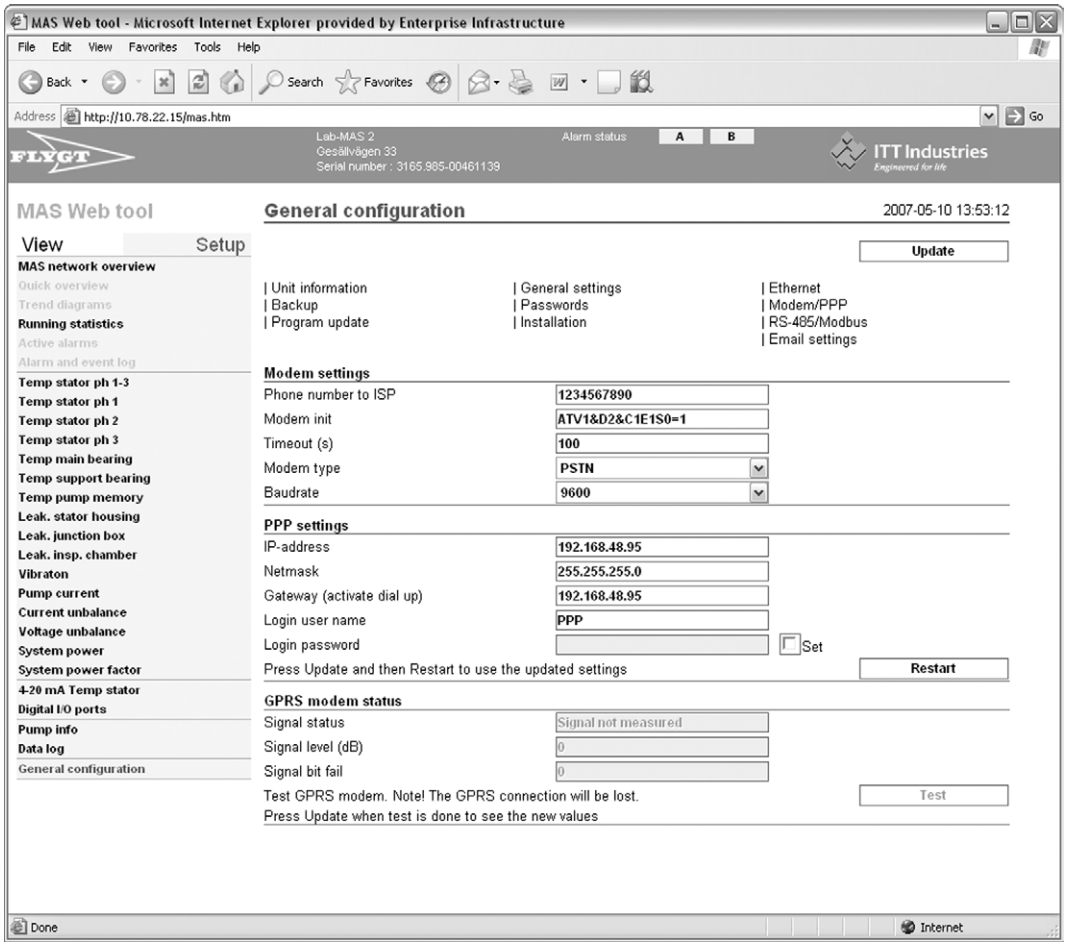
Purpose

The modem/PPP settings are used for direct connection between the computer and the base unit using modem and PPP (point-to-point protocol). The settings must be done for the unit to initiate a dial up connection, which is needed for the alarm distribution through email to work when connected via a dial up modem connection.

Instruction

Follow these steps to make the modem/PPP settings:

1. Click Setup — General configuration — Modem/PPP.
   Result: The Modem/PPP settings window is opened.



2.
- Enter the phone number to the ISP (internet service provider) providing the email service.
- Enter time-out time, modem type and baudrate.
  Comment: A modem init text string capable of initiating most GSM or PSTN modems is already entered by default (ATV1&D2&C1E1S0=1) in the Modem init field. For certain types of modems, and for GPRS modems, this string might need to be changed, see the modem documentation.

3.
- Set the gateway to be the same as the IP address above (to activate dial up).
  Comment: The PPP IP address is by default set to 192.168.48.95 and the netmask to 255.255.255.0. These do usually not need to be changed.

- Click Update and then Restart to use the updated settings.

4. Click (Setup – General configuration –) Ethernet.

5.
- Set the gateway to 0.0.0.0.
- Click Update and then Restart to use the updated settings.

6.
- Click (Setup — General configuration —) Modem/PPP.
- If the ISP providing the email service requires login user name and password, tick **Set** and enter the required information.
- Click Update and then Restart to use the updated settings.

7.
- If a GPRS modem is used, click **Test** to test the modem status (the GPRS modem status shows: Signal status, Signal level and Signal bit fail).
- Click Update to see the new values.
  Comment: The GPRS connection will be lost during the test.

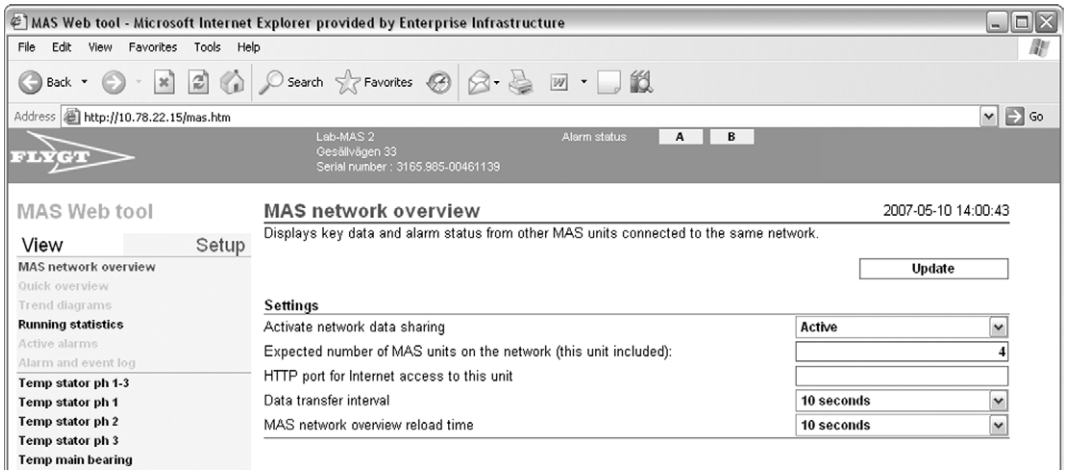
Set Up MAS Network Overview

Instruction

MAS network overview displays key data and alarm status from other units connected to the same network.

Follow these steps to set up the MAS network overview:

1. Click Setup – MAS network overview.
   Result: The MAS Network overview is opened.



2.
- Select **Active** in the drop down menu to activate network data sharing.
- Enter the expected number of units on the network (enables this unit to detect when other units on the network are down).
  Comment: Sharing and receiving information via the MAS network overview requires that the units are connected on the same side of any routers on the network.

3. Enter this unit's assigned HTTP port in the router. When directly connected to the LAN, not via Internet, this field can be left blank.
   Comment: To be able to follow a link from one unit to another when accessing the MAS network from the Internet, a router with port forwarding must be used.

4.
- Enter the interval with which the data should be transferred and the network overview reload time.
- Click Update to execute changes.

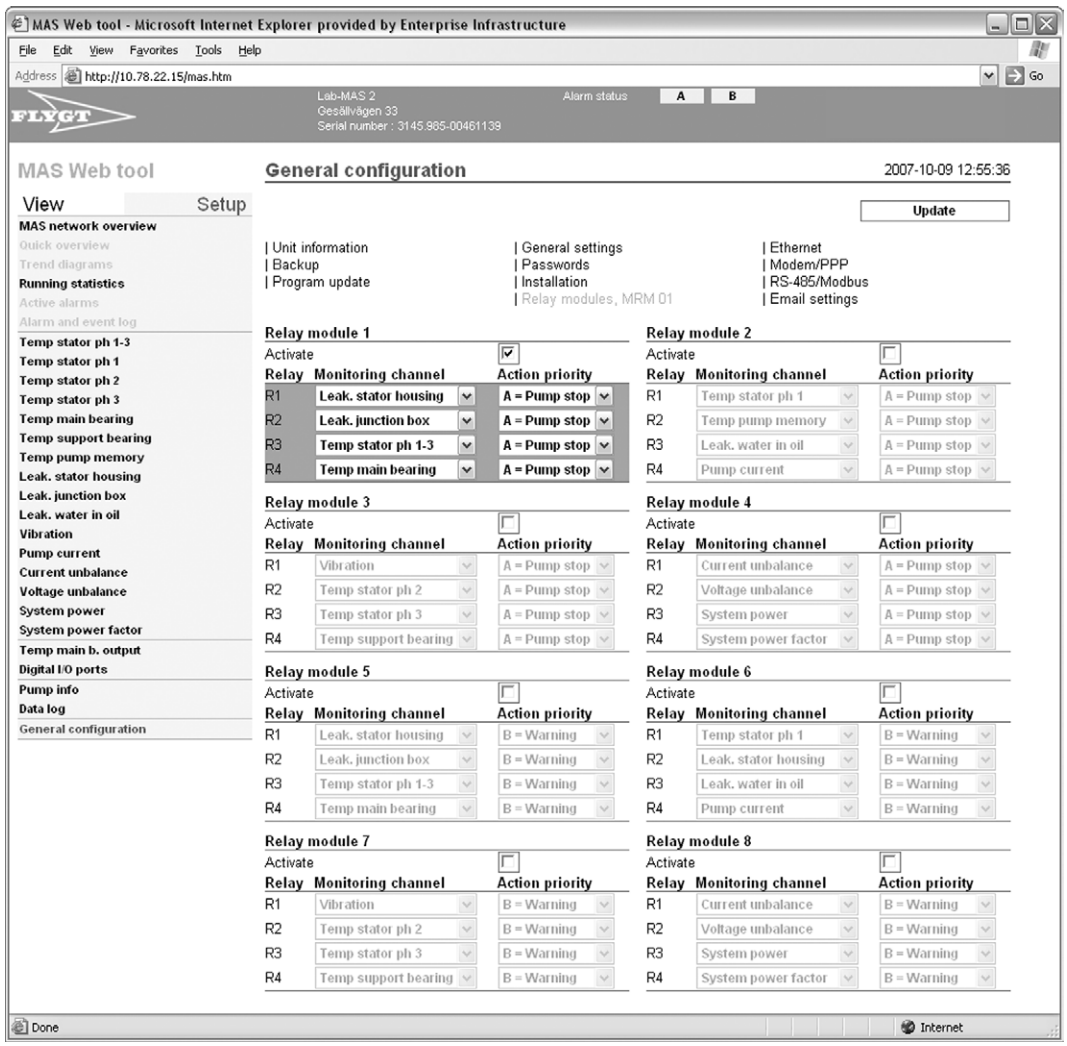
Set Up MAS Relay Module

Instruction

MRM 01 is an optional output unit containing four relays. It enables communication for individual monitoring channel alarms (A and/or B alarms) to specific relays and LEDs on the relay module(s).

Follow these steps to set up the MAS Relay Module, MRM 01:

1. Make sure that the communication with the relay module(s) is activated. See section *Configure Communication (RS-485, Modbus)*.
2. Click Setup – General configuration – Relay Modules, MRM 01.
   Result: The Relay Modules, MRM 01 window is opened.


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Address http://10.78.22.15/mas.htm
Lab-MAS 2
Gesällvägen 33
Serial number : 3145.985-00461139
Alarm status A B
MAS Web tool
General configuration
2007-10-09 12:55:36
View Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. water in oil
Vibration
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
Temp main b. output
Digital I/O ports
Pump info
Data log
General configuration
Update
| Unit information
| Backup
| Program update
| General settings
| Passwords
| Installation
| Relay modules, MRM 01
| Ethernet
| Modem/PPP
| RS-485/Modbus
| Email settings
Relay module 1
Activate
Relay Monitoring channel Action priority
R1 Leak. stator housing A = Pump stop
R2 Leak. junction box A = Pump stop
R3 Temp stator ph 1-3 A = Pump stop
R4 Temp main bearing A = Pump stop
Relay module 2
Activate
Relay Monitoring channel Action priority
R1 Temp stator ph 1 A = Pump stop
R2 Temp pump memory A = Pump stop
R3 Leak. water in oil A = Pump stop
R4 Pump current A = Pump stop
Relay module 3
Activate
Relay Monitoring channel Action priority
R1 Vibration A = Pump stop
R2 Temp stator ph 2 A = Pump stop
R3 Temp stator ph 3 A = Pump stop
R4 Temp support bearing A = Pump stop
Relay module 4
Activate
Relay Monitoring channel Action priority
R1 Current unbalance A = Pump stop
R2 Voltage unbalance A = Pump stop
R3 System power A = Pump stop
R4 System power factor A = Pump stop
Relay module 5
Activate
Relay Monitoring channel Action priority
R1 Leak. stator housing B = Warning
R2 Leak. junction box B = Warning
R3 Temp stator ph 1-3 B = Warning
R4 Temp main bearing B = Warning
Relay module 6
Activate
Relay Monitoring channel Action priority
R1 Temp stator ph 1 B = Warning
R2 Leak. stator housing B = Warning
R3 Leak. water in oil B = Warning
R4 Pump current B = Warning
Relay module 7
Activate
Relay Monitoring channel Action priority
R1 Vibration B = Warning
R2 Temp stator ph 2 B = Warning
R3 Temp stator ph 3 B = Warning
R4 Temp support bearing B = Warning
Relay module 8
Activate
Relay Monitoring channel Action priority
R1 Current unbalance B = Warning
R2 Voltage unbalance B = Warning
R3 System power B = Warning
R4 System power factor B = Warning
Done
Internet

3.
- Activate a module by ticking **Activate**.
- Select the monitoring channels that should be associated with the each of the four relays on the module.
- Select the Action priority for each relay, that is, if the relay should communicate an A-alarm or a B-alarm on the specified monitoring channel.

4. Repeat the settings in step 3 for all connected modules.
5. Click Update.

Settings with the Operator Panel

Overview

Table of Contents

This chapter contains the following topics:

Topic

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Log in and Change Password 101
Set Unit Information 102
Retrieve Sensor Information from Pump Memory 103
Make a Manual Setting of a Monitoring Channel 104
Record Running Time and Number of Starts 105
Check and Change the IP Address 107

Change the Display Language

Instruction

Follow these steps to change the display language:

Step	Action	Result
1	• Press Esc a number of times to go to the main menu. • Go to the Setup menu (2). • Press OK.	Menu Language (2.1) is opened and the present language is displayed.
2	Press OK to enter edit mode.	The text is flashing.
3	• Change the language using up/down arrow. • Press OK.	
4	Press OK to confirm the change.	“Value saved” is displayed briefly and then menu Language again.

Log in and Change Password

Log in

Without logging in the entire View menu but only a part of the Setup menu is accessible. To access the rest of the Setup menu you have to log in using a password.

Follow these steps to log in:

Step	Action	Result
1	• Go to Log in (2.3) in the Setup menu. • Press OK to enter edit mode.	Position 1 of the password is flashing.
2	• Press up arrow once to enter the digit 1. • Move to the next position by using the right arrow.	
3	• Enter the rest of the password (default is 1234) using up/down/right arrow. • Press OK.	Menu Change password (2.4) is displayed.

Change Password

Follow these steps to change password:

Step	Action	Result
1	• Go to Change password (2.4) in the Setup menu using up/down arrow. • Press OK to enter edit mode.	Position 1 of the password is flashing.
2	• Press up arrow to enter the desired first digit. • Move to the next position using right arrow.	
3	• Enter the rest of the new password using up and right arrow. • Press OK and confirm the change with OK.	“Value saved” is displayed briefly.

Set Unit Information

Instruction

Follow these steps to set unit information:

Step	Action	Result
1	• Go to General config (2.5) in the Setup menu using up/down arrow. • Press OK to enter menu Clock (2.5.1).	The text is flashing.
2	• Press OK to enter edit mode. • Enter date and time using the arrows. • Press OK and confirm the change with OK.	“Value saved” is displayed briefly and then menu Clock again.
3	• Go to menu Temperature unit (2.5.3) using down arrow. • Press OK to enter edit mode.	The text is flashing.
4	• Select **°C** or **°F** using the arrows. • Press OK and confirm the change with OK.	“Value saved” is displayed briefly and then menu Temperature unit again.
5	• Go to menu MAS id (2.5.4) using down arrow. • Enter the identification number using the arrows. • Press OK and confirm the change with OK.	“Value saved” is displayed briefly and then menu MAS id again.

Retrieve Sensor Information from Pump Memory

Instruction

Follow these steps to retrieve sensor information from the pump memory:

Step	Action	Result
1	• Go to General config (2.5) in the Setup menu using up/down arrow. • Press OK and use down arrow to enter menu Pump memory (2.5.5). • Press OK to enter edit mode.	The text is flashing.
2	• Select **Active** using the up/down arrow. • Press OK and confirm the change with OK.	“Value saved” is displayed briefly.
3	• Go to menu Pump memory sync (2.5.6) using the down arrow. • Press OK to enter menu Copy all from PM to MAS (2.5.6.1). • Press OK to perform **Copy all from PM to MAS**.	“Execute sync?” is displayed.
4	Press OK to confirm.	• “Wait” is displayed during the synchronization • After synchronization “Sync executed” is displayed briefly and then menu Copy all from PM to MAS. • The base unit is now set up with the selection of sensors in the actual pump and the recommended factory alarm settings.

Make a Manual Setting of a Monitoring Channel

Reasons for Making Settings

There are two reasons for making manual/additional settings to monitoring channels:

- There is no pump memory. You want to complete the following 4 default channels with additional channels or/and adjust a setting for these channels:
  – Temp stator ph 1-3 (Thermal switches)
  – Temp main bearing (Pt100 sensor to measure temperature)
  – Leak. stator housing (Float switch to monitor for leakage)
  – Leak. junction box (Float switch to monitor for leakage).
- You want to adjust the settings copied from the pump memory.

Instruction

Follow these steps to activate and adjust monitoring channels manually:

Step	Action	Result/Comment
1	Go to the applicable monitoring channel menu, for example Temp stator ph 1 (2.7), using up/down arrow.	
2	• Press OK to enter menu Sensor (2.7.1). • Press OK to enter edit mode.	The text is flashing.
3	Select sensor using the up/down arrow.	
4	• Press OK to save and activate the channel. • Press OK to confirm.	• “Value saved” is displayed briefly and then menu Sensor. • The remaining settings menus for the channel are now available.
5	Make the applicable changes (using the arrows and OK) to • Alarm limits • Alarm action priority • Alarm reset options • Alarm delays	Adjusting and activating the other channels is done in a similar way, but may differ a little from the described example.
6	If you are making a CAS retrofit and the pump is not fitted with Leak junction box (old pumps or certain pump models), deactivate this channel: • Go to menu Leakage junction box (2.14), using up/down arrow. • Press OK to enter menu Sensor (2.14.1) and OK to enter edit mode. • Select **None** using up/down arrow. • Press OK to save and deactivate the channel and OK to confirm.	

Record Running Time and Number of Starts

Conditions for Recording

Running time and number of starts are registered provided that either of the following conditions is fulfilled:

- Pump current is measured by means of a current transformer connected to terminals 11-12 *or*
- Pump current is measured by means of a Power analyzer (PAN 311/PAN312) *or*
- If pump current is not measured, a volt free contact, connected to the Run Digital input (terminals 23-24) is used to indicate pump on/off.

Note! If pump current is measured by means of a current transformer connected to terminals 11-12, make sure the transformer secondary rating is 1A AC.

Instruction

Follow these steps to enable recording of running time and number of starts:

Step	Action
1	• Go to Pump current (2.17) in the Setup menu, using up/down arrow. • Press OK to enter menu Input source (2.17.1). • Press OK to enter edit mode. **Result:** The text is flashing.
2	Select one of the following input sources (to see if the pump is running), using up/down arrow: • **Run input (MAS)** • **Current (power an.)** • **Current input (MAS)** • **None**
3	• Press OK to save and activate the channel (and the measuring of running time and number of starts). • Press OK to confirm. **Result:** • "Value saved" is displayed briefly and then menu Input source. • The remaining settings menus for the channel are now available.
4	If the selected input source is • Current (power an.), continue with step 5. • Current input (MAS), continue with step 6. • Run input (MAS), no further settings are necessary (the current is not measured). The menu 2.17 is now called Run input. • None, no further settings are necessary.

Step	Action
5	**Current (power analyzer)** • Make additional settings to the channel. See section *Make a Manual Setting of a Monitoring Channel*. • Activate and set the following channels: — System power (2.18) — Voltage unbalance (2.19) — Current unbalance (2.20) — System power factor (2.21)
6	**Current input (MAS)** • Make additional settings to the channel. See section *Make a Manual Setting of a Monitoring Channel*. • Go to menu Transformer rating (2.17.7) and enter the primary rating of the current transformer (used for calculation of a threshold level to determine whether the pump is on or off).

Check and Change the IP Address

Instruction

Follow these steps to check and change the IP address:

Step	Action	Result
1	• Go to menu Ethernet IP address (2.5.16) in the Setup menu using up/down arrow. • Check that the IP address is the same as in the web browser address field.	
2	To change the IP address, press OK to enter edit mode and menu 2.5.16.1.	The text is flashing.
3	• Change the first position of the IP address using up/down arrow. • Go to the next position using down arrow and change to the desired IP address. • Press OK.	
4	Press OK to confirm the change.	“Value saved” is displayed briefly and then menu Ethernet IP address again.
5	If the IP address is changed, restart the base unit by disconnecting the power supply briefly.	

Operation

Overview

Table of Contents

This chapter contains the following topics:

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Analyze and Acknowledge Alarms Using the Web Tool 112
View and Acknowledge Alarms Using the Operator Panel 113
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Backup and Restore Parameters 126
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Handle Alarms

Topics in this Section

This section contains the following topics:

- General Information
- Alarm Indication and Listing
- Analyze and Acknowledge Alarms Using the Web Tool
- View and Acknowledge Alarms Using the Operator Panel

General Information

Two Alarm Levels

Alarms are generated when an abnormal condition occurs, either associated with the pump or internal. For most monitoring channels, MAS uses two levels of alarms, A and B. Alarms are categorized depending on how serious or urgent the condition is — this is defined during the setup.

This table describes the alarm levels:

Level	Description
A	Indicates a serious condition. The interlock relay (Go) opens to stop the pump, the A-alarm relay is activated and indications are shown in red.
B	Indicates a less serious condition or is used as a warning level. The pump is allowed to run (the interlock relay 'Go' remains closed), the B-alarm relay is activated and indications are shown in yellow.

Active Alarm

An active alarm in the Active alarms list is a currently active alarm; that is, an alarm limit is currently exceeded or there is an internal fault such as corrupt communications.

Alarm Indication and Listing

Indication and Acknowledge-ment Process

A new alarm is indicated with a flashing LED on the operator panel. If an active alarm is reset/acknowledged, it turns into a fixed light to indicate the acknowledgement by the operator and that the condition is still abnormal. When the fault is fixed and the condition is back to normal, a repeated reset/acknowledge will terminate alarm indications and set relays to their normal status.

Alarm Indication

This table shows where and how the alarms are indicated:

The alarms are indicated ...	**on the ...**
• with LEDs *and* • as text on the display	operator panel.
with LEDs	base unit front.
as colored fields (yellow and red) at the top of each web page	web tool.
as colored fields (yellow or red) on the MAS network overview page	web tool. If data sharing is activated alarms will be indicated on all units on the network.
with an email sent to given recipients. See more information below.	

Alarm Indication by Email

If activated an email can be sent to up to four recipients in case of an alarm. An email will be sent

- on A alarms
- on B alarms
- when the condition is back to normal.

The email will contain all vital information about the alarm such as:

- Unit name and address.
- Date and time of the alarm.
- Channel name and information about the conditions of the alarm

Alarm Listing

All alarms and a number of events can be viewed in the web tool and in the operator panel menu. The 100 latest alarms are listed and the oldest are deleted when new alarms are registered.

This table shows where and how the alarms are listed:

The alarms are listed under ...	**in the ...**
View — Event log (1.1)	operator panel menu system.
View — Active alarms	web tool.
View — Alarm and event log	web tool.

Reference: See section *Event Messages and Actions* in chapter *Trouble Shooting* for more information on events.

Alarm and Event Plot Database

In the event of an alarm, it is preferred to store data at the highest resolution for analysis. Therefore there is a separate memory function which extracts a time frame of data of high resolution from the cyclic memory. This database is sized to store data from the latest seven recorded alarm events found in the Alarm and event log. For each alarm in the list, data from all channels is acquired

- nine minutes before the alarm and one minute after (1 second resolution)
- four hours before the alarm (1 minute resolution).

Analyze and Acknowledge Alarms Using the Web Tool

Alarm Status Indication and Actions

The alarm status is displayed with the A and B icons in the blue field at the top of the web pages.

This table shows the alarm status indication, the reason for this and the actions:

Appearance of the alarm status icons	Reason for the condition	Action
Solid green	**1.** Status is OK *or* **2.** An alarm with automatic reset could have been active and then returned to not active.	**1.** No action. **2.** Check the Alarm and event log.
• Flashing red (A-alarm) *or* • flashing yellow (B-alarm)	**1.** An alarm is presently active and not acknowledged *or* **2.** An alarm with manual reset has been active and returned to normal condition but has not been acknowledged.	**1.** Acknowledge the alarm. **Result:** The icon turns solid red/yellow. **2.** Acknowledge the alarm. **Result:** The icon turns solid green. **Reference:** See section *Acknowledge All Active Alarms* below.
• Solid red (A-alarm) *or* • solid yellow (B-alarm)	**1.** An alarm is presently active and acknowledged *or* **2.** An alarm with manual reset has been active, acknowledged and returned to normal condition.	**1.** Wait until the condition is back to normal. **Result:** The icon turns solid • green *or* • red/yellow (according to item 2 below) **2.** Acknowledge the alarm again. **Result:** The icon turns solid green.

Acknowledge All Active Alarms

Follow these steps to acknowledge all active alarms:

Step	Action
1	Click View – • Active alarms *or* • Alarm and event log.
2	Click **Acknowledge**. **Result:** All active alarms are acknowledged.

View and Analyze Alarms

Follow these steps to view and analyze an alarm:

Step	Action
1	If an alarm is active (displayed by the alarm status icons, A and B), click • the icons *or* • View – Active alarms. **Result:** The Active alarms list is opened and all currently active alarms are displayed.
2	If the alarm is no longer active, click View – Alarm and event log to view it.
3	If the alarm • is marked in light blue (the seven latest alarms), continue with step 4. • is *not* marked in light blue this short alarm information is the only information available.
4	Click the alarm. **Result:** The Alarm and event plot is opened and detailed information on the alarm is displayed. **Reference:** See *View the Alarm and Event Plot* in section *View Operation Data using the Web Tool* on how to use the alarm and event plot.

View and Acknowledge Alarms Using the Operator Panel

Alarm Status Indication and Actions

The alarm status is displayed with the two LEDs on the right side of the operator panel.

This table shows the alarm status indication, the reason for this and the actions:

Appearance of the alarm LEDs	Reason for the condition	Action
No light	**1.** Status is OK *or* **2.** An alarm with automatic reset could have been active and then returned to not active.	**1.** No action. **2.** Check menu Event log (1.1).

Appearance of the alarm LEDs	Reason for the condition	Action
Flashing red	**1.** An alarm is presently active and not acknowledged *or* **2.** An alarm with manual reset has been active and returned to normal condition but has not been acknowledged	**1.** Press Reset to acknowledge the alarm. **Result:** The LED turns solid red. **2.** Press Reset to acknowledge the alarm. **Result:** The LED turns solid green.
Solid red	**1.** An alarm is presently active and acknowledged *or* **2.** An alarm with manual reset has been active, been acknowledged and returned to normal condition	**1.** Wait until the condition is back to normal. **Result:** The LED turns solid • green *or* • red (according to item 2 below) **2.** Press Reset to acknowledge the alarm again. **Result:** The LED turns solid green.

View Alarms

Follow these steps to view alarms:

Step	Action	Result
1	• Go to Event log (1.1) in the Setup menu using down arrow. • Press OK to view the last occurring event (menu 1.1.1).	• The first display row shows the channel that is affected by the event, for example Leak. Stator housing. • The second display row describes the type of event, for example Leakage (A)
2	If there is an arrow in the lower right corner of the display, press right arrow.	More information on the event is displayed. This information is typically time of the event and value of the channel.
3	If you want to view the second to last event (and so on), go to menu 1.1.2 using down arrow.	

View Operation Data

Topics in this Section

This section contains the following topics:

- General Information
- View Operation Data Using the Web Tool
- View Operation Data Using the Operator Panel

General Information

Introduction

MAS is able to present data both with figures and diagrams. Momentary data, max and min values and recordings over a long time period can be viewed. With the operator panel, only momentary data and max and min values are presented. To view other logged data, a computer with a web browser is required.

Trend Diagrams Database

The system measures and stores data continuously in a cyclic memory on a first in, first out basis. The highest resolution is one second, which means that the system measures and stores measurement results each second. To keep the amount of data within the limits of the memory capacity, each new data value replaces an old. The highest resolution of data is transformed into average values in steps: each minute a minute average value is formed, each hour an hour average value and so on. The result is that the further back you wish to study data, the lower the resolution.

This table shows the data that is stored for each analog channel in the trend diagrams database:

Resolu-tion	Value formed by	Time frame	No. of values in frame
Second	Measurement each second	14 minutes	840
Minute	Average of 60 second values	4 hours	240
Hour	Average of 60 minute values	8,3 days	200
24–hour	Average of 24 hour values	6 months	200
Month	Average of 30 24–hour values	20 years	250
Year	Average of 12 month values	20 years	20

View Operation Data Using the Web Tool

Available Information Menus

The table shows the available information menus on the main (left) menu:

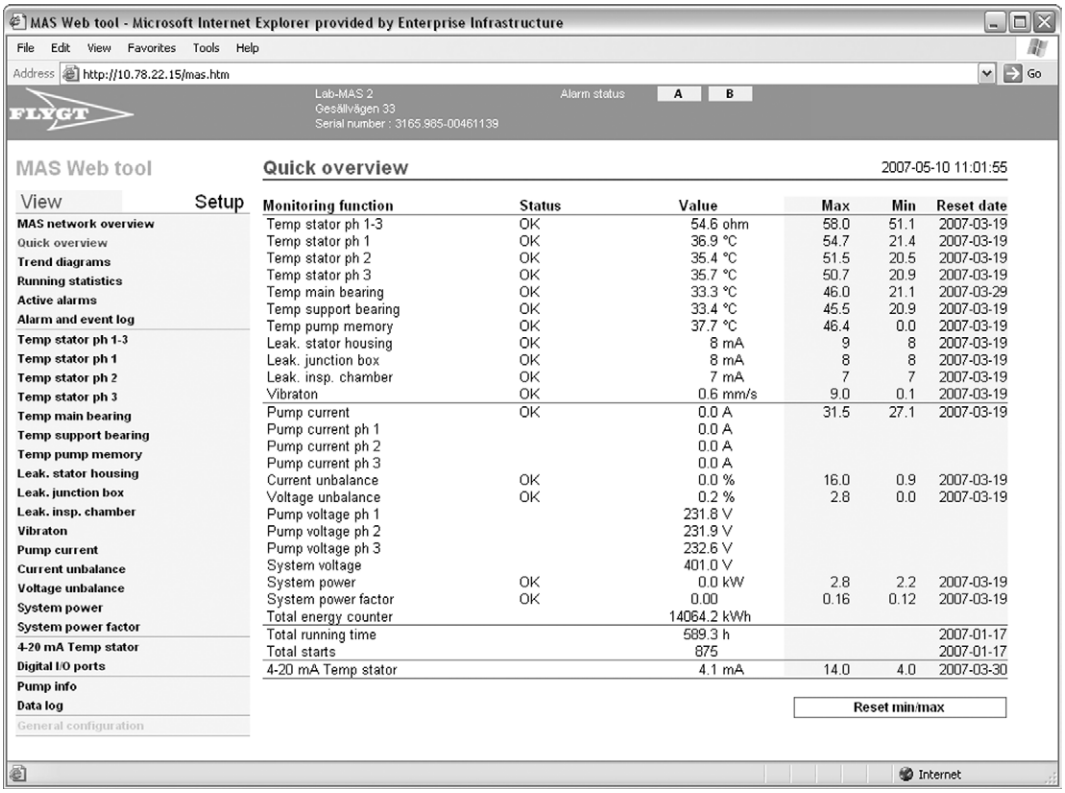
Function	Description/Sub menu
MAS network overview	Displays key data and alarm status from other MAS units connected to the same network.
Quick overview	Indicates the status of all monitoring channels and present measurement results.
Trend diagrams	Up to three monitored channels can be plotted and viewed simultaneously in one chart.
Running statistics	Contains histograms, a list of recent start and stops and trip meter data.
Active alarms	A list of channels, where the monitored quantity currently exceeds an alarm limit.
Alarm and event log	Shows active, acknowledged and reset alarms and events. Light blue list items link to a plot function where you can view graphs of the data leading up to and before/after the alarm.
Monitoring channels	The monitoring channels currently available are between the next two yellow lines of the main menu (Temp stator ph 1-3 to System power factor). There are separate pages for each channel containing a chart showing logged data of desired resolution, average values, min and max.
Analog output	Shows the present value of the 4-20 mA output.
Digital I/O ports	Shows the status of output relays and digital inputs Run and Reset.
Pump info	Contains pump data plate info, service log (notes) and when service will be prompted.
Data log	A function to download measured data for export.

View Status and Measurement Results

Present status and measurement results are shown in the Quick overview window for a quick analysis of the pump status.

Follow these steps to view status and measurement results:

1. Click View – Quick overview.
   Result: Present status and measurement results are shown in the Quick overview window. There are separate columns for max and min display values since the latest reset.


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Address http://10.78.22.15/mas.htm
Go
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status
A
B
MAS Web tool
View
Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Vibraton
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
4-20 mA Temp stator
Digital I/O ports
Pump info
Data log
General configuration
Quick overview
2007-05-10 11:01:55
Monitoring function Status Value Max Min Reset date
Temp stator ph 1-3 OK 54.6 ohm 58.0 51.1 2007-03-19
Temp stator ph 1 OK 36.9 °C 54.7 21.4 2007-03-19
Temp stator ph 2 OK 35.4 °C 51.5 20.5 2007-03-19
Temp stator ph 3 OK 35.7 °C 50.7 20.9 2007-03-19
Temp main bearing OK 33.3 °C 46.0 21.1 2007-03-29
Temp support bearing OK 33.4 °C 45.5 20.9 2007-03-19
Temp pump memory OK 37.7 °C 46.4 0.0 2007-03-19
Leak. stator housing OK 8 mA 9 8 2007-03-19
Leak. junction box OK 8 mA 8 8 2007-03-19
Leak. insp. chamber OK 7 mA 7 7 2007-03-19
Vibraton OK 0.6 mm/s 9.0 0.1 2007-03-19
Pump current OK 0.0 A 31.5 27.1 2007-03-19
Pump current ph 1 0.0 A
Pump current ph 2 0.0 A
Pump current ph 3 0.0 A
Current unbalance OK 0.0 % 16.0 0.9 2007-03-19
Voltage unbalance OK 0.2 % 2.8 0.0 2007-03-19
Pump voltage ph 1 231.8 V
Pump voltage ph 2 231.9 V
Pump voltage ph 3 232.6 V
System voltage 401.0 V
System power OK 0.0 kW 2.8 2.2 2007-03-19
System power factor OK 0.00 0.16 0.12 2007-03-19
Total energy counter 14064.2 kWh
Total running time 589.3 h 2007-01-17
Total starts 875 2007-01-17
4-20 mA Temp stator 4.1 mA 14.0 4.0 2007-03-30
Reset min/max
Internet

2. If desired, click **Reset min/max** to make a quick reset of all min and max values. Individual reset is possible on the separate windows for each channel.
   Reference: See section *View Monitoring Channels* on how to view additional status and measurement information.

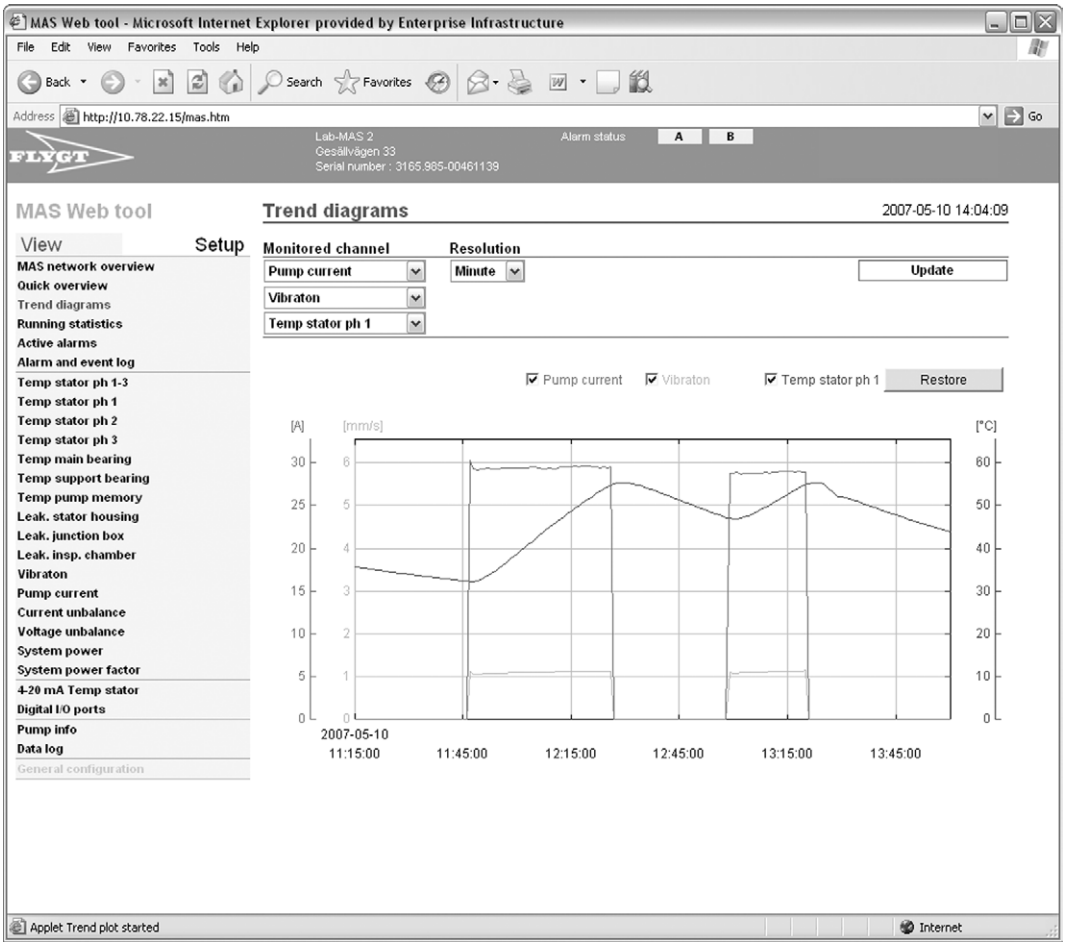
View Trend Diagrams

Click View – Trend diagrams to view graphs of logged data. Use the function to view sequences of events and to analyze correlation between measured channels. Three channels can be plotted simultaneously.

Produce and View a Chart

Follow these steps to produce a chart:

1. Click View – Trend diagrams.
   Result: The Trend diagrams window is opened.



2. Select up to three channels to plot in the same chart versus three separate axes in the drop-down menus of the Monitored channel field.

3.
- Select resolution: values measured every second *or* average values.
- Click Update.
  Result: All selected curves are shown.
  Reference: See section *General Information, Trend Diagrams Database* above.

4.
- Tick the check box of one channel at a time *or*
- Tick two or three channels to study the correlation between them.

5.
- Zoom in curves by pressing the left mouse button, holding it down and making a rectangle down to the right over the area to view in detail.
- Zoom out again by pressing the left mouse button, holding it down and making a rectangle up to the left.

6. Change the Y-axis for better presentation if desired. See section *Make a Manual Setting of a Monitoring Channel* in chapter *Settings with the Web Tool*.

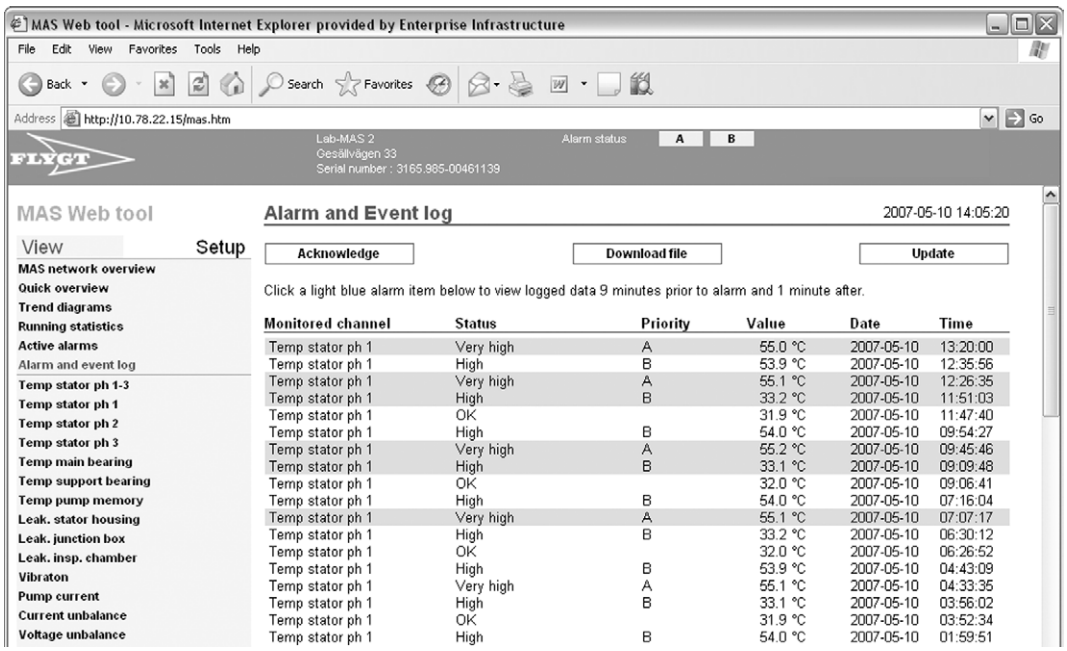
7. Click Restore if you want to return to the initial diagram.

View the Alarm and Event Plot

The Alarm and event plot is used to study the course of events leading up to and surrounding an alarm.

Follow these steps to view the Alarm and event plot:

1. Click View – Alarm and event log.
   Result: The Alarm and event log window is opened.


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Back Search Favorites
Address http://10.78.22.15/mas.htm
Go
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status A B
MAS Web tool
View Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Vibraton
Pump current
Current unbalance
Voltage unbalance
Alarm and Event log
2007-05-10 14:05:20
Acknowledge
Download file
Update
Click a light blue alarm item below to view logged data 9 minutes prior to alarm and 1 minute after.
Monitored channel Status Priority Value Date Time
Temp stator ph 1 Very high A 55.0 °C 2007-05-10 13:20:00
Temp stator ph 1 High B 53.9 °C 2007-05-10 12:35:56
Temp stator ph 1 Very high A 55.1 °C 2007-05-10 12:26:35
Temp stator ph 1 High B 33.2 °C 2007-05-10 11:51:03
Temp stator ph 1 OK 31.9 °C 2007-05-10 11:47:40
Temp stator ph 1 High B 54.0 °C 2007-05-10 09:54:27
Temp stator ph 1 Very high A 55.2 °C 2007-05-10 09:45:46
Temp stator ph 1 High B 33.1 °C 2007-05-10 09:09:48
Temp stator ph 1 OK 32.0 °C 2007-05-10 09:06:41
Temp stator ph 1 High B 54.0 °C 2007-05-10 07:16:04
Temp stator ph 1 Very high A 55.1 °C 2007-05-10 07:07:17
Temp stator ph 1 High B 33.2 °C 2007-05-10 06:30:12
Temp stator ph 1 OK 32.0 °C 2007-05-10 06:26:52
Temp stator ph 1 High B 53.9 °C 2007-05-10 04:43:09
Temp stator ph 1 Very high A 55.1 °C 2007-05-10 04:33:35
Temp stator ph 1 High B 33.1 °C 2007-05-10 03:56:02
Temp stator ph 1 OK 31.9 °C 2007-05-10 03:52:34
Temp stator ph 1 High B 54.0 °C 2007-05-10 01:59:51

2. Click an alarm marked in light blue to view a chart showing the measurement results leading up to and before/after the alarm.
   Note! Alarms marked in light blue represent transitions into a “worse condition”, that is, from OK to alarm or from a B-priority alarm (warning) to an A-priority alarm (pump stop).
3. Select one of the following resolution options in the Resolution drop-down menu and click Update:

- **Second**: Measurement values each second, 9 minutes prior to the alarm trip point and one minute after.
- **Minute**: Minute averages values formed by 1–second values over a minute, 4 hours prior to the alarm trip point.

Reference: See section *Produce and View a Chart* above on how to use the plot function.

View Running Statistics

Introduction

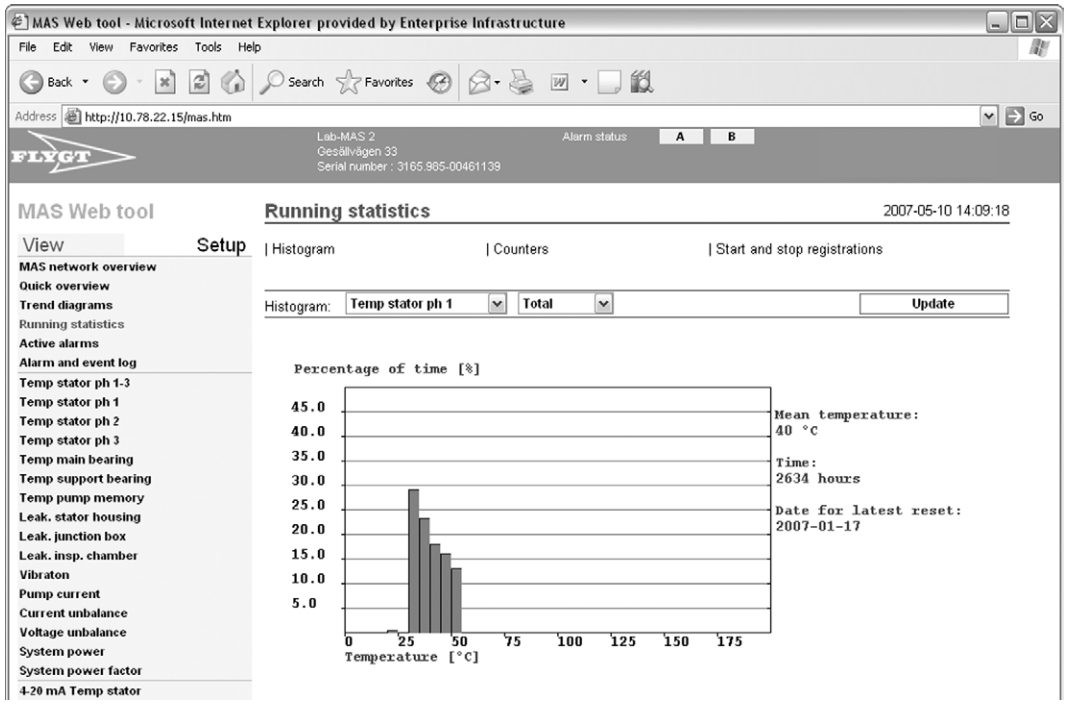
Running statistics consist of
- histogram data
- start and stop registrations.

This data is saved both in the base unit and in the pump memory. The base unit copies data to the pump memory every two hours.

Instruction

Follow these steps to view running statistics:

1. Click View – Running statistics.
   Result: The Running statistics window is opened.



2. If you want to view histogram data on a channel,
- click **Histogram**.
- select channel and period to view in the Histogram drop-down menus.
- click Update.

3.
- Click **Counters** to view a list of ten counters that log running time and number of starts.
- If desired, click Save to save a counter and keep track of running time and number of starts since the latest save.

4. Click **Start and stop registrations** to view a list of the latest 50 starts and stops and running times.

Interpret a histogram

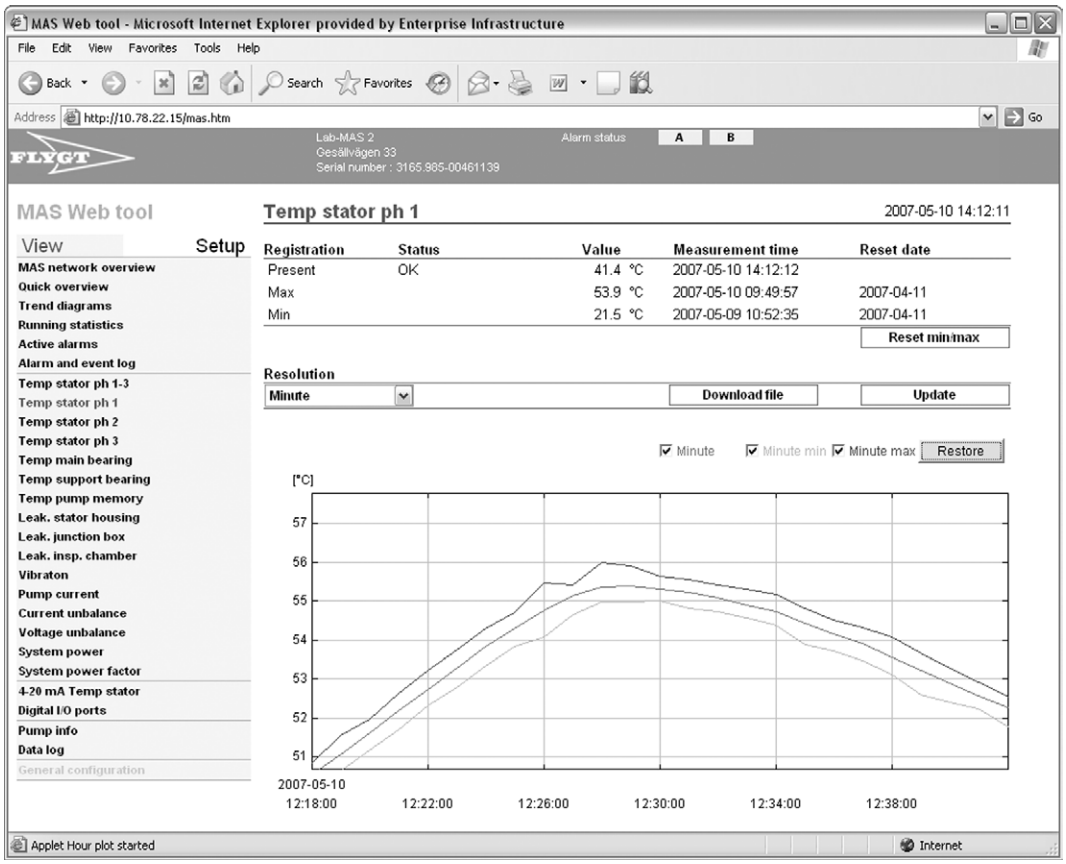
The highest bar in the histogram above should be interpreted in the following way: Approximately 29 % of the total time the temperature has been between 30°C and 35°C.

View Monitoring Channels

Follow these steps to view monitoring channels:

1. Click View – Temp stator ph 1 (example).
   Result:

- The present measurement value and status for the channel is displayed.
- The Min and Max values, and the time they occurred, are displayed.
- A plot of the selected channel is displayed, with the specified resolution. If the curve shows average values (applies to minute, hour, day, month and year), depending on resolution of the plot, there are also curves showing the minimum and maximum values for the same time interval.



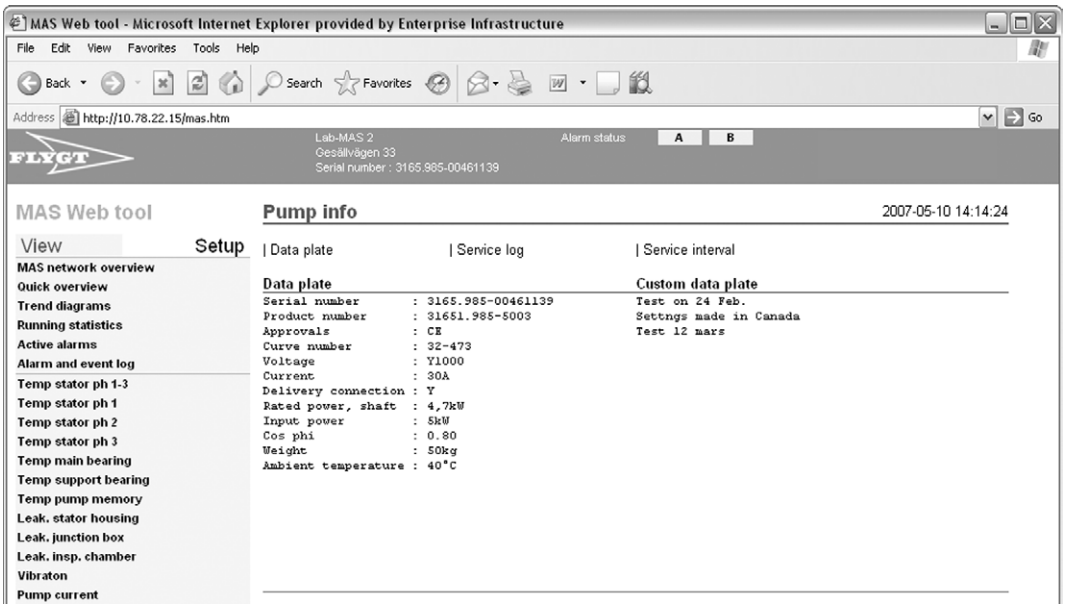
2. If desired, click **Reset min/max** to reset the min and max values for the specific channel.

Reference: See section *Produce and View Chart* on how to use the plot function.

View Pump Information

Follow these steps to view pump information:

1. Click View – Pump info.
   Result: The Pump info window is opened.



2.

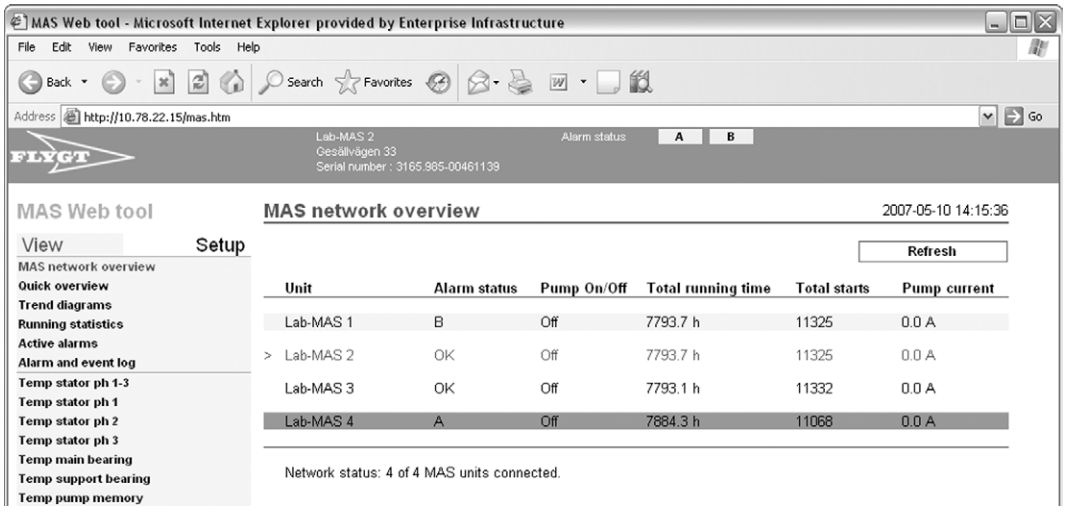
- Click **Data plate** to view data plate information containing pump identity, electrical data etc
- Click **Service log** to view the operator's own service notes
- Click **Service interval** to view information on when the next service will be prompted according to the operator's own settings.

View Data from Other Units on the Same Network

Follow these steps to view key data and alarm status from other units connected to the same network:

1. Click View – MAS network overview.
Result:

- The page displays a list containing information on all detected units with the active unit indicated with an arrow and red text.
- If there is an alarm on any unit in the list, that row is yellow (priority B) or red (priority A) depending on the alarm priority.
- Below the list the number of detected and expected MAS units on the network is shown. If these numbers differ from each other and a unit is not connected as expected this line is yellow.



2. Click on a row to view more information on a specific unit.

Result: A new browser is opened.

View Operation Data Using the Operator Panel

View Status and Readings for a Channel

Follow these steps to view status, measurement reading and min and max reading for a monitoring channel:

Step	Action	Result/Comment
1	Go to the menu of the applicable channel, for example Temp stator ph 1–3 (1.6) using down arrow.	The name (Temp stator ph 1-3) and status (OK/High/very high…) of the channel is displayed.
2	Press OK.	**Result:** • Menu Value (1.6.1) is opened. • The actual measurement reading of the channel is displayed (in ohm in the example). **Comment:** Depending on type of channel/sensor the display of actual measurement reading and status may switch places in the menu of the channel.
3	Press down arrow to go to the menus that display min and max values of the channel (1.6.2 and 1.6.3).	
4	If desired, reset the min and max values individually in their respective menus by pressing OK and confirming with OK.	“Value reset!” is displayed briefly.

View Running Statistics

Follow these steps to view running statistics:

Step	Action	Result
1	• Go to menu Pump total runtime (1.3) using down arrow. • Press OK to view the present value of the trip counter (pump counter runtime), that is, the runtime since the trip runtime counter last was reset.	Menu Pump counter runtime (1.3.1) is opened.

Step	Action	Result
2	• Press OK to reset the present trip counter. • Confirm with OK.	• “Wait” is displayed briefly, then back to menu Pump counter runtime (1.3.1). • The trip counter is now reset and the previous value is saved in a list of the 10 last trip counters.
3	Press down arrow to view the 10 previous trip counters and reset dates.	
4	• Go to menu Pump total starts (1.4) using down arrow. • Press OK to view the present value of the start counter (pump counter starts), that is, the number of starts since the trip starts counter last was reset.	Menu Pump counter starts (1.4.1) is opened.
5	• Press OK to reset the present start counter. • Confirm with OK.	• “Wait” is displayed briefly, then back to menu Pump counter starts (1.4.1). • The start counter is now reset and the previous value is saved in a list of the 10 last start counters.
6	Press down arrow to view the 10 previous start counters and reset dates.	
7	• Go to menu Pump start and stop (1.5) using down arrow. • Press OK to view the start time of the last run period of the pump.	
8	• Press right arrow to view the stop time of the last run period. • Press right arrow again to view the run time of the last run period.	
9	Press down arrow and repeat the steps above to view information on the second to last run period.	Information on the 50 last run periods is saved.

View Pump Information

Follow these steps to view pump information:

Step	Action
1	• Go to menu Dataplate info (1.2) using down arrow. • Press OK to open the information items in the data plate. **Result:** Menu Serial number (1.2.1) is opened.
2	• Press right arrow to view the serial number. • Move to the next item in the data plate using down arrow. • Repeat the steps above to view the other items of the data plate.
3	Press Esc to go back to menu Dataplate info (1.2).

View Status on Digital I/O Ports

Follow these steps to view status on digital I/O ports:

Step	Action
1	Go to menu Digital I/O ports (1.23) using down arrow.
2	Press OK to go to the first digital I/O channel, Run input (1.23.1), and to view its present status (On/Off).
3	Press down arrow to view the status of the other I/O ports (Reset input, A-alarm relay, B-alarm relay and Go relay).

View Additional Data from the Power Analyzer

If there is a Power analyzer in the system it is possible to view additional data besides the existing channels for power analysis.

Follow these steps to view additional operating data from the Power analyzer:

Step	Action
1	Go to menu Power analyzer (1.24) using down arrow.
2	Press OK to go to the first information menu, Pump voltage ph 1 (1.24.1), and to view its present status.
3	Press down arrow to view the status of the other information menus (Pump voltage ph 2 and ph 3, Pump current ph 1, ph 2 and ph 3, Pump current mean, System voltage, System power, System power factor and Total energy counter).

Handle Database Information and Parameters

Topics in this Section

This section contains the following topics:

- Backup and Restore Parameters
- Preserve, Upload and Delete Measurement Data

Backup and Restore Parameters

Parameter Definition

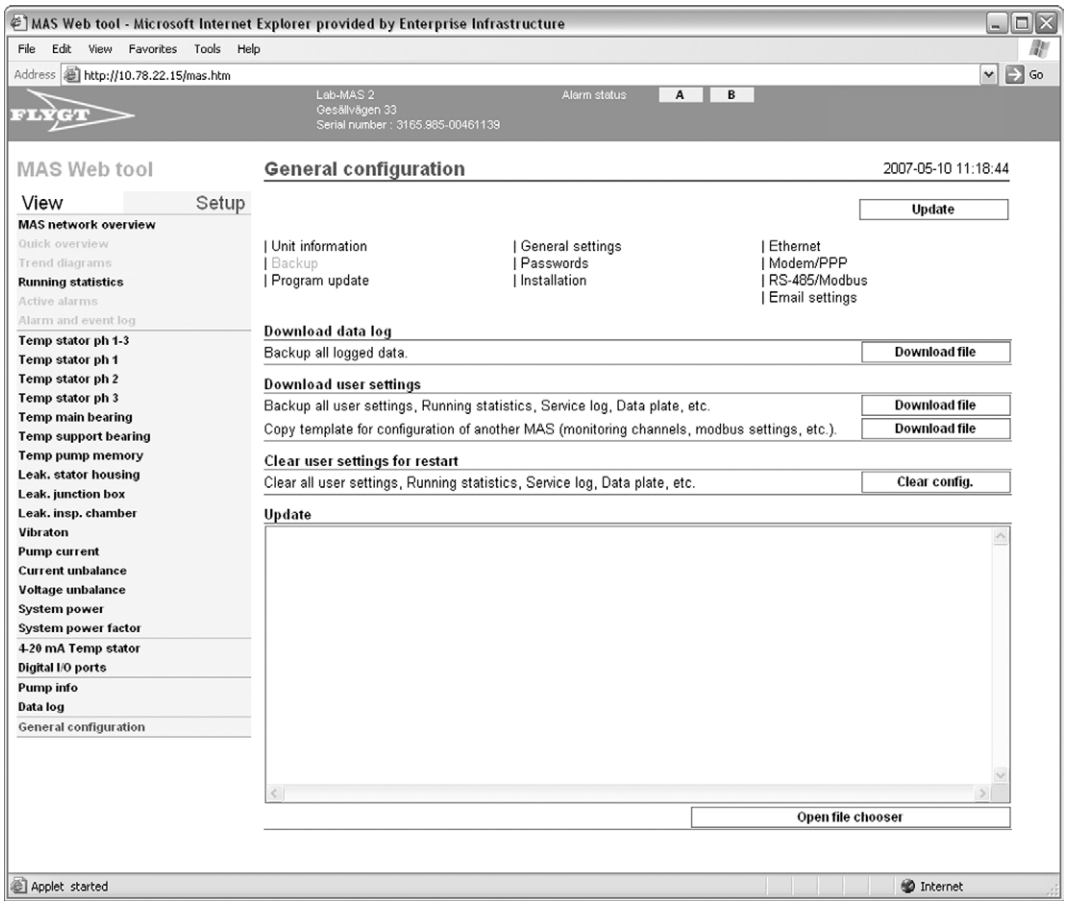
Parameter means all sorts of settings used internally by the program. Parameters may control the program logic, contain running data or simply text. A system, which has been set up for a particular application, has a unique setting of parameters.

Make a Complete Backup of All Parameters

All the parameter settings can be downloaded and backed up. This is done for instance prior to a program update or replacement of a base unit so that the base unit can be restored afterwards.

Follow these steps to make a complete backup of all parameters:

1. Click Setup — General configuration — Backup.
   Result: The Backup window is opened.



2. In the Download user settings field, click **Download file** to the right of the text "Backup all user settings, Running statistics, Service log, Data plate, etc".
3. Create a directory and save the file Backup.par.
   Note! It is recommended to give the file a specific name.
   Reference: If you want to make a complete backup of the system, the database also has to be saved. See section *Preserve, Upload and Delete Measurement Data*.

Restore All Parameters from a Backup File

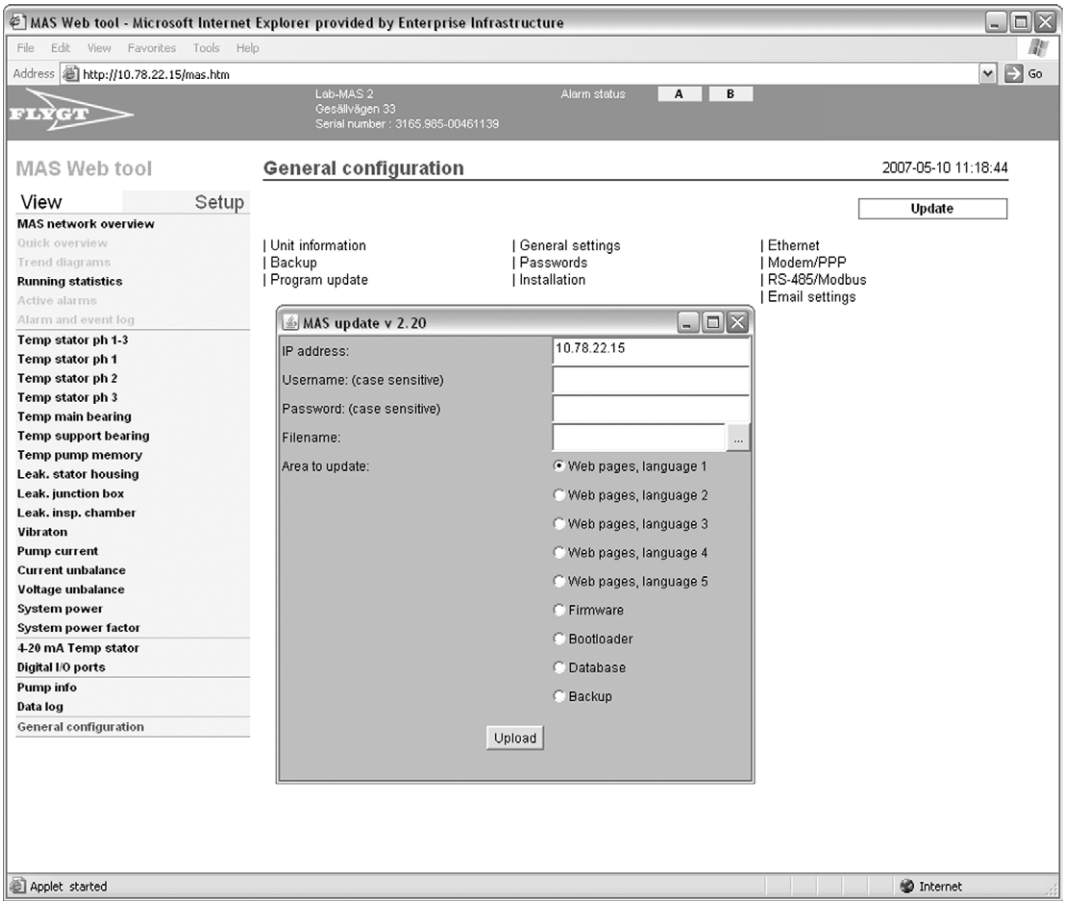
Choose one of the following methods to restore all parameters from a backup file:

- Restore parameters using ftp (file transfer protocol)
- Restore parameters using the Backup-Update function.

Restore parameters using ftp

Follow these steps to restore parameters from a backup file using ftp:

1. Click Setup – General configuration – Program update.
   Result: The MAS update dialog box is opened.



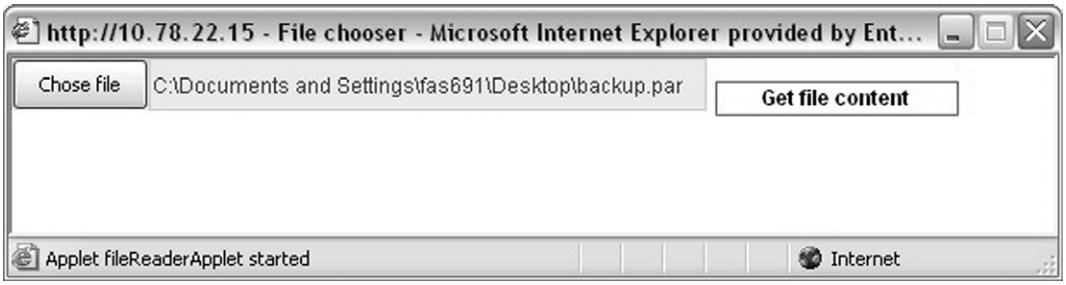
2. Enter IP address, User name and Password in the MAS Update dialog box.
3.

- Click the browse button (...) to the right of the Filename field and select the backup(.par) file.
- Select **Backup** and click Upload.

Restore parameters using the Backup-Update function

Follow these steps to restore parameters from a backup file using the Backup-Update function:

1. Click Setup – General configuration – Backup.
2. Click **Open file chooser** below the Update window.
   Result: The File chooser dialog box is opened.



3. Click Choose file and select the backup(.par) file.
   Result: The search path of the file is displayed in the File chooser dialog box.
4. Click Get file content.
   Result: The parameters are automatically entered in the Update window.
5. Click Update.

Result: “Update in progress” is displayed above the Update window. The message “Update OK!” confirms that the update is completed.

Change and Load Selected Parameters into the Base Unit

Follow these steps to change and load selected parameters into the base unit:

Step	Action
1	Open a file containing parameters (for example the Backup.par file) with Wordpad or Notepad.
2	Make changes to the parameters.
3	Select and copy desired parameters.
4	Click Setup — General configuration — Backup.
5	Paste the parameters into the Update field and click Update. **Result:** ”Update in progress” is displayed above the Update window. The message “Update OK!” confirms that the update is completed.

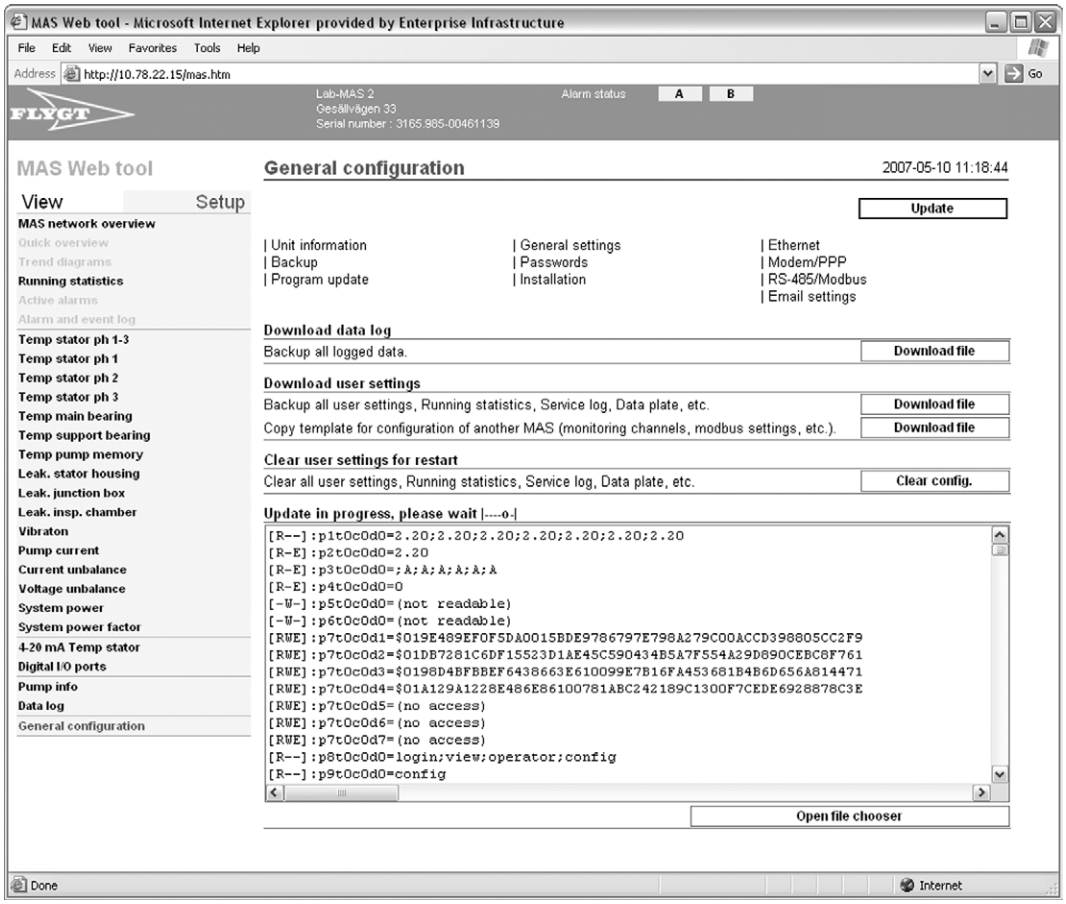
Enter Data Plate Text in the Base Unit and Pump Memory

Follow these steps to enter data plate text into the base unit and pump memory:

1. Open a file containing parameters (for example the Backup.par file) with Wordpad or Notepad.
2. Extract (cut) parameters from p1004t0c0d1 up to p1004t0c0d12 containing data plate text. Delete the other parameters.

```
[R--]:p551t8c0d0=0;0;0;0;0;0;0
[R--]:p551t9c0d0=0;0;0;0;0;0;0;0;0;0;0;0;0;0;0;0
[RWE]:p1000t0c0d0=1
[RWE]:p1001t0c0d0=1
[R--]:p1002t0c0d0=0
[RWE]:p1003t0c0d0=2.20
[RWE]:p1004t0c0d1=Serial number       : 3154
[RWE]:p1004t0c0d2=Product number      : 3356.665-5094
[RWE]:p1004t0c0d3=Approvals           : CE
[RWE]:p1004t0c0d4=Curve number        :
[RWE]:p1004t0c0d5=Voltage             : 400 V
[RWE]:p1004t0c0d6=Current             : 20 A
[RWE]:p1004t0c0d7=Delivery connection : D
[RWE]:p1004t0c0d8=Rated power, shaft  :
[RWE]:p1004t0c0d9=Input power         :
[RWE]:p1004t0c0d10=Cos phi             :
[RWE]:p1004t0c0d11=Weight              :
[RWE]:p1004t0c0d12=Ambient temperature : 40 degC
[RWE]:p1004t0c0d13=
[RWE]:p1004t0c0d14=
[RWE]:p1004t0c0d15=
[RWE]:p1004t0c0d16=
[RWE]:p1004t0c0d17=
[RWE]:p1004t0c0d18=
[RWE]:p1004t0c0d19=
[RWE]:p1004t0c0d20=
[R--]:p1005t0c0d0=31.3704
[RWE]:p1006t0c0d0=1;0;13049;512;2916;4388;1349;2835;1402;1426;938
[RWE]:p1007t0c0d0=52.1;0.0;3478.9;128.0;620.0;782.0;198.0;377.0;179.0;181.0;123.0
```

   Reference: See section *Change and load selected parameters into the base unit* above.
3. Edit the text to the right of the rightmost colon. This field contains the actual data plate text. There are 12 parameters containing data plate text.
4. Select text lines and copy.
5. Click Setup — General configuration — Backup.
6. Paste the text into the Update field and click Update.
   Result: ”Update in progress” is displayed above the Update window. In a minute the text changes take effect (refresh page to view changes). The new data plate text is now entered into the base unit.



7. Click Setup — Pump info — Pump memory.
8. In the Manual pump memory synchronization field, select **Copy all from MAS to pump memory** and click Copy.
   Result: ”Do you want to perform the synchronization?” is displayed.
9. Click OK.
   Result: ”Synchronization OK!” confirms when the synchronization is performed.

Preserve, Upload and Delete Measurement Data

Reasons for Saving or Deleting Data and Settings

This section deals with how to save valuable measurement data and how to reset the system for a fresh start. There are several reasons to save measurement data and settings:

- Backup in case a base unit is broken and needs to be replaced.
- Troubleshooting — data and settings can be sent for analysis.
- Demonstration and training purposes — interesting application cases can be demonstrated.
- Research and development feedback.

In case the system is set up to monitor a new pump you may wish to

- preserve data associated with the pump taken out of operation
- delete all measurement data, histograms and counters in the used system to start fresh.

Preserve All Measurement Data in a System

There are two methods for saving all measurement data in a system:

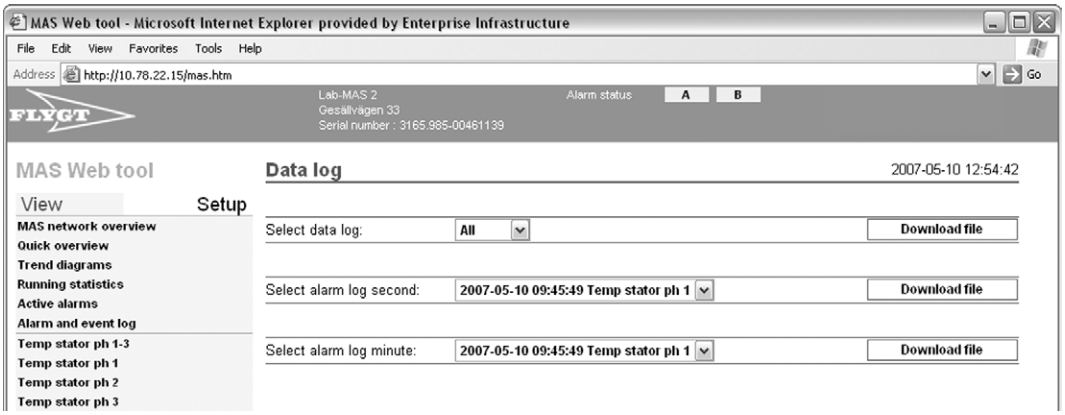
- Save all measurement data to be viewed in (for example) Excel.
- Save all measurement data to be restored into the system.

Note! If you want to make a complete backup of the system, the parameters also have to be backed up. See section *Backup and Restore Parameters*.

Save all measurement data to be viewed in Excel

Follow these steps to save all measurement data to be viewed in Excel:

1. Click View – Data log.
   Result: The Data log window is opened.

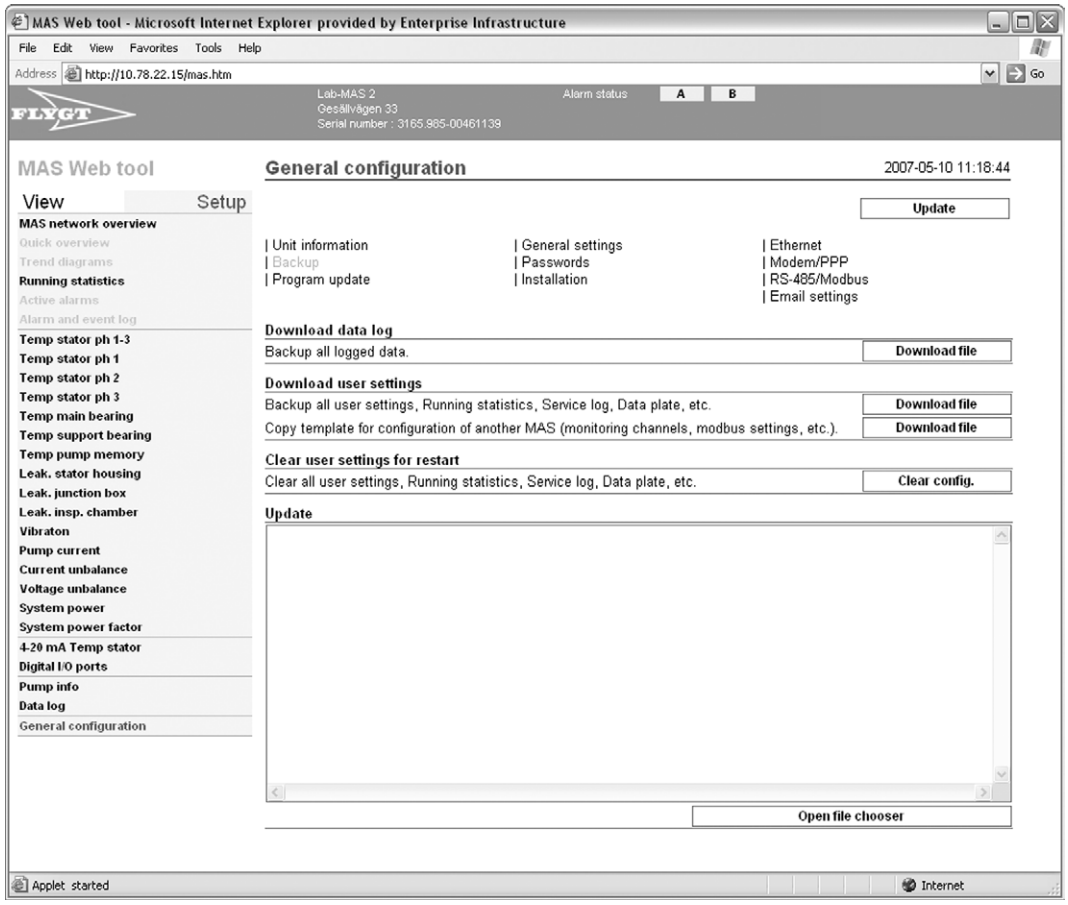


2.
- Select **All** in the Select data log drop-down menu and click Download file.
- Save the file.
  Result: The database (.dta) file can now be opened and viewed with for example Excel.

Save all measurement data to be restored into the system

Follow these steps to save all measurement data to be restored into the system:

1. Click Setup – General configuration – Backup.
   Result: The Backup window is opened.



2.

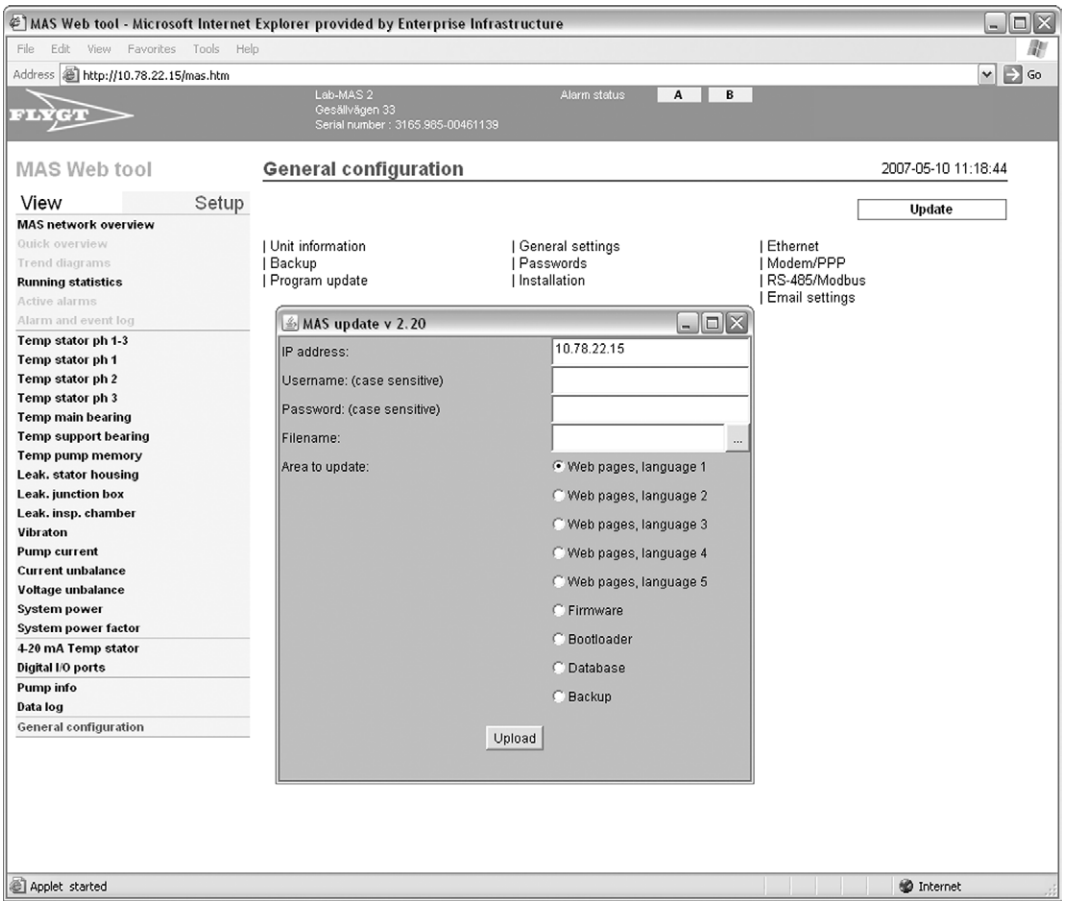
- Select **Backup all logged data** in the Download data log field.
- Click Download file.

  Result: The database(.bin) file can now be restored into a base unit.

Upload All Measurement Data to a System

Follow these steps to upload all measurement data:

1. Click Setup – General configuration – Program update.
   Result: The MAS update dialog box is opened.



2. Enter IP address, User name and Password in the MAS update dialog box.

3.

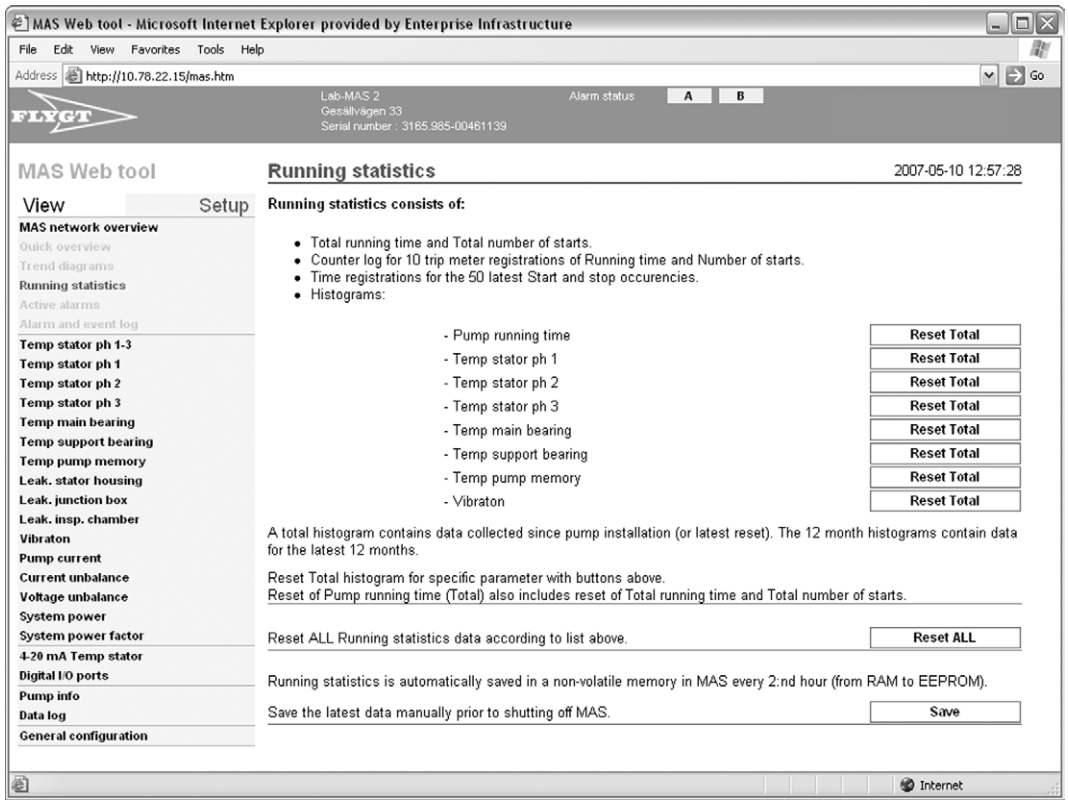
- Click the browse button (...) to the right of the File name field and select the database(.bin) file.
- Select **Database** in the Area to update field and click Upload.
  Result: The database is loaded into the base unit. The unit restarts which may take a couple of minutes.

Delete All Measurement Data in a System

Follow these steps to delete all measurement data in a system:

1. Click Setup – Data log.
2.
- Select **All** in the Select data log drop-down menu and click Clear.
- Click OK to confirm.
  Result: The cyclic memory database, the alarm and event plot and the alarm and event log are deleted.

3. Click (Setup –) Running statistics.
   Result: The Running statistics window is opened.


MAS Web tool - Microsoft Internet Explorer provided by Enterprise Infrastructure
File Edit View Favorites Tools Help
Address http://10.78.22.15/mas.htm
Go
Lab-MAS 2
Gesällvägen 33
Serial number : 3165.985-00461139
Alarm status
A
B
MAS Web tool
Running statistics
2007-05-10 12:57:28
View
Setup
MAS network overview
Quick overview
Trend diagrams
Running statistics
Active alarms
Alarm and event log
Temp stator ph 1-3
Temp stator ph 1
Temp stator ph 2
Temp stator ph 3
Temp main bearing
Temp support bearing
Temp pump memory
Leak. stator housing
Leak. junction box
Leak. insp. chamber
Vibraton
Pump current
Current unbalance
Voltage unbalance
System power
System power factor
4-20 mA Temp stator
Digital I/O ports
Pump info
Data log
General configuration
Running statistics consists of:
Total running time and Total number of starts.
Counter log for 10 trip meter registrations of Running time and Number of starts.
Time registrations for the 50 latest Start and stop occurencies.
Histograms:
- Pump running time
- Temp stator ph 1
- Temp stator ph 2
- Temp stator ph 3
- Temp main bearing
- Temp support bearing
- Temp pump memory
- Vibraton
Reset Total
A total histogram contains data collected since pump installation (or latest reset). The 12 month histograms contain data for the latest 12 months.
Reset Total histogram for specific parameter with buttons above.
Reset of Pump running time (Total) also includes reset of Total running time and Total number of starts.
Reset ALL Running statistics data according to list above.
Reset ALL
Running statistics is automatically saved in a non-volatile memory in MAS every 2:nd hour (from RAM to EEPROM).
Save the latest data manually prior to shutting off MAS.
Save
Internet

4. Click **Reset ALL** to erase all the running statistics data.
   Note! Reset of the Pump running time histogram also includes reset of the figure indicating the pump's total running time (normally not reset during a pump's life) and the figure indicating Total starts.

Note! A record of Total energy is kept in the Power analyzer. Reset is done by using the menu system of the Power analyzer.

Handle Pump Information and Service Functions

Topics in this Section

This section contains the following topics:

- Handle Pump Information and Service Functions Using the Web Tool
- Set Service Interval Using the Operator Panel

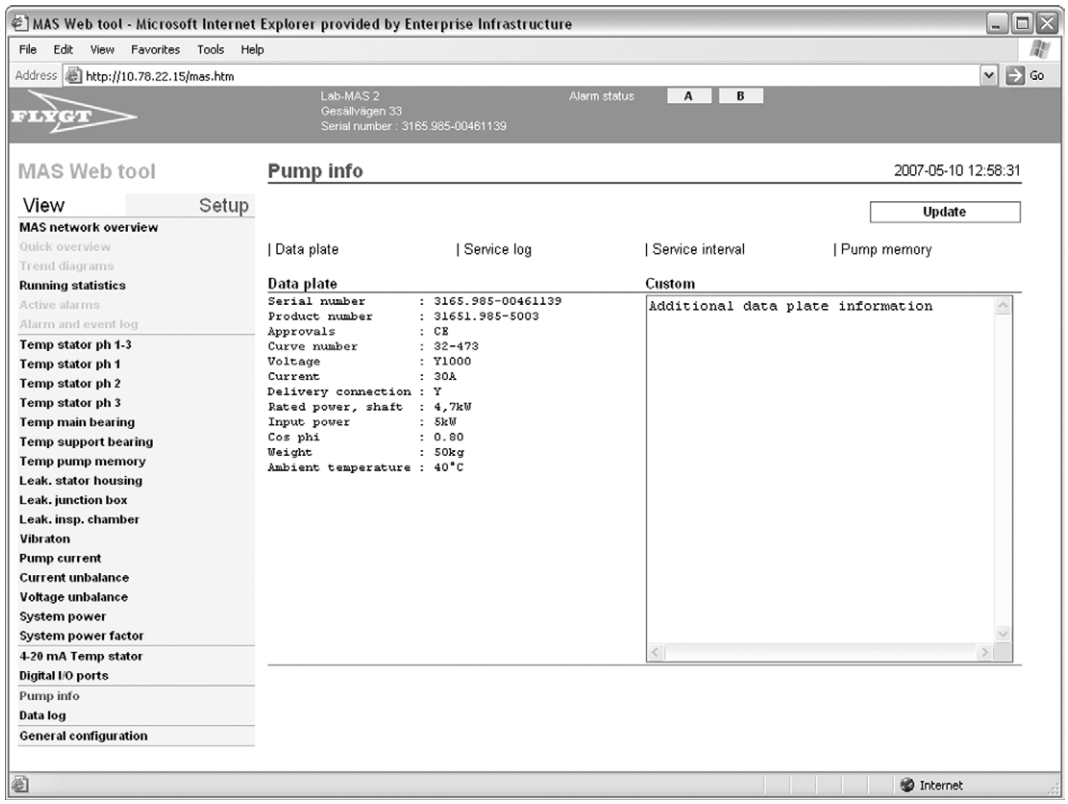
Handle Pump Information and Service Functions Using the Web Tool

Make Changes to Data Plate Information

The data plate has one fixed part (original factory information) and one editable part. If changes are made to the pump that effect data plate info, it is possible to make additions in the Custom field.

Follow these steps to make changes to data plate information:

1. Click Setup – Pump info – Data plate.
   Result: The Data plate window is opened.



2.
- Enter additional data plate information in the Custom text field.
- Click Update.
  Result: ”File saved!” is displayed.

3. Click OK.
   Result: The data plate info of the base unit is now updated. The changes will be copied to the pump memory during the next automatic synchronization (every 2 hours).

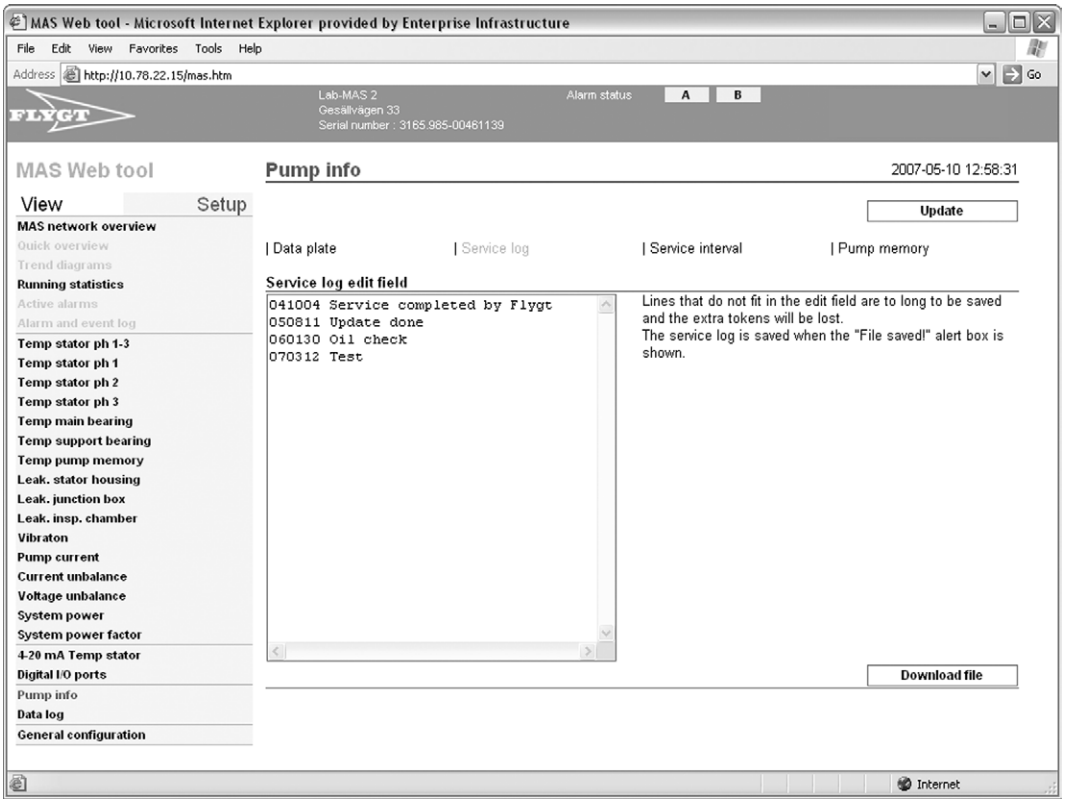
4. If you want to copy the changes immediately, see section *Copy Data To/From Pump Memory*.

Make an Entry in the Service Log

It is possible to make own service notes and store them in the base unit and pump memory.

Follow these steps to make an entry in the service log:

1. Click Setup – Pump info – Service log.
   Result: The Service log window is opened.



2.
- Enter service notes in the Service log edit field.
- Click Update.
  Result: ”File saved!” is displayed.

3. Click OK.
   Result: The service log of the base unit is now updated. The changes will be copied to the pump memory during the next automatic synchronization (every 2 hours).

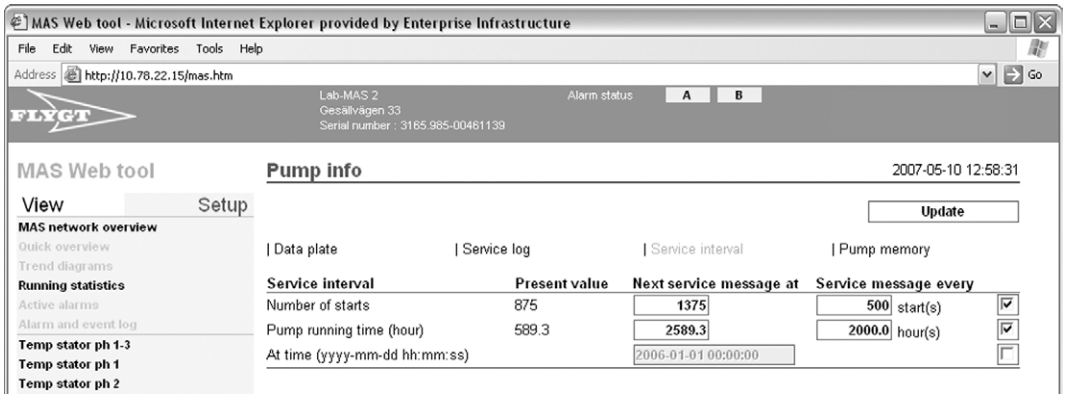
4. If you want to copy the changes immediately, see section *Copy Data To/From Pump Memory*.

Set Service Interval

Service will be prompted according to the operator's own settings based on running time, number of starts or a fixed date.

Follow these steps to set the service interval:

1. Click Setup – Pump info – Service Interval.
   Result: The Service interval window is opened.



2. Tick the checkbox to the right of the desired service interval function, to get a service message at a specified
- number of starts *or*
- pump running time (hours) *or*
- point of time.

3. Enter
- the time or number of starts for the next service message ("Next service message at")
- the interval with which the service messages should recur ("Service message every")
  Note! For the function At time you only need to enter the time for "Next service message at".

4. Click Update.

Set Service Interval Using the Operator Panel

Instruction

Service will be prompted according to the operator's own settings based on running time, number of starts or a fixed date.

Follow these steps to set service interval:

Step	Action	Result/Comment
1	• Go to menu Service interval (2.5.2) using down arrow and OK. • Press OK to enter menu At number of starts (2.5.2.1).	
2	If desired, use down arrow to go to menu • At running time (2.5.2.2) *or* • At date (2.5.2.3).	"Active/Inactive" is displayed to show if the functions are activated.

Step	Action	Result/Comment
3	Press OK to enter the settings menu.	Menu Service every (example: 2.5.2.1.1) is displayed together with the present setting.
4	Press OK to enter edit mode and set the interval of the service message.	
5	• Select interval value using up/down arrow. • Press OK.	"Save value?" is displayed.
6	Confirm with OK.	"Value saved" is displayed briefly.
7	Press down arrow to view menu Present reading (example: 2.5.2.1.2), that is, the present number of starts or running time.	
8	Press down arrow to view menu Next service at (example: 2.5.2.1.3) together with the present setting.	
9	Press OK to enter edit mode and set the number of starts or running time for when the next service message should occur.	
10	• Select interval value using up/down arrow. • Press OK.	"Save value?" is displayed.
11	Confirm with OK.	"Value saved" is displayed briefly.
12	Press down arrow.	Menu Service function activation (example: 2.5.2.1.4) is displayed together with the status, Active/Inactive.
13	Press OK to enter edit mode and activate/inactivate the function.	
14	• Select **Active/Inactive** using up/down arrow. • Press OK.	"Save value?" is displayed.
15	Confirm with OK.	"Value saved" is displayed briefly.
16	• Press Esc to go to menu At number of starts (2.5.2.1). • Check that the function status is **Active**.	**Note!** The function must be activated to work.
17	If additional conditions to generate service messages are necessary, repeat steps 2–16 for function • At running time *and/or* • At date.	For function At date (2.5.2.3) it is only possible to set Next service at (2.5.2.3.1) and to activate the function (2.5.2.3.2).

Copy Data To/From Pump Memory

Topics in this Section

This section contains the following topics:

- Copy Data To/From Pump Memory Using the Web Tool
- Copy Data To/From Pump Memory Using the Operator Panel

Data Copied During Pump Memory Synchronization

The following data is automatically copied from MAS to the pump memory every 2 hours:

- Pump data plate information
- Alarm settings
- Start and stop registrations
- Histograms
- Service log

The same data that is copied during the automatic synchronization can be copied manually to and from the pump memory. See instructions below.

Copy Data To/From Pump Memory Using the Web Tool

Copy All Data From Pump Memory to MAS

At first installation, the base unit should be updated with the contents of the pump memory to upload factory settings of sensors and associated parameters (alarm limits, reset options, etc.). If any changes are made to the pump memory during service, the new data should be uploaded to the base unit.

Follow these steps to copy all data from pump memory to MAS:

Step	Action	Result
1	Click Setup — Pump info — Pump memory.	
2	In the Manual pump memory synchronization field, select **Copy all from pump memory to MAS** and click Copy.	“Do you want to perform the synchronization?” is displayed.
3	Click OK.	“Synchronization OK!” confirms when the synchronization is performed.

Copy All Data From MAS to Pump Memory

It is possible to copy any recent changes or latest measurements immediately to the pump memory, for example before service, to make sure the latest data is stored in the pump memory before removing the pump.

Follow these steps to copy all data from MAS to pump memory:

Step	Action	Result
1	Click Setup — Pump info — Pump memory.	

Step	Action	Result
2	In the Manual pump memory synchronization field, select **Copy all from MAS to pump memory** and click Copy.	“Do you want to perform the synchronization?” is displayed.
3	Click OK.	“Synchronization OK!” confirms when the synchronization is performed.

Copy Data To/From Pump Memory Using the Operator Panel

Copy All Data from Pump Memory to MAS

At first installation, the base unit should be updated with the contents of the pump memory to upload factory settings of sensors and associated parameters (alarm limits, reset options, etc.). If any changes are made to the pump memory during service, the new data should be uploaded to the base unit.

Follow these steps to copy all data from the pump memory to MAS:

Step	Action	Result
1	• Go to General config (2.5) in the Setup menu using up/down arrow. • Press OK and use down arrow to enter menu Pump memory sync (2.5.6).	
2	• Press OK to enter menu Copy all from PM to MAS (2.5.6.1). • Press OK to perform **Copy all from PM to MAS**.	“Execute sync?” is displayed.
3	Press OK to confirm.	• “Wait” is displayed during the synchronization • After synchronization “Sync executed” is displayed briefly and then menu Copy all from PM to MAS. • The base unit is now set up with the selection of sensors in the actual pump and the recommended factory alarm settings.

Copy All Data from MAS to Pump Memory

It is possible to copy any recent changes or latest measurements immediately to the pump memory, for example before service, to make sure the latest data is stored in the pump memory before removing the pump.

Follow these steps to copy all data from MAS to the pump memory:

Step	Action	Result
1	• Go to General config (2.5) in the Setup menu using up/down arrow. • Press OK and use down arrow to enter menu Pump memory sync (2.5.6).	
2	• Press OK and use down arrow to enter menu Copy all from MAS to PM (2.5.6.2). • Press OK to perform **Copy all from MAS to PM**.	"Execute sync?" is displayed.
3	Press OK to confirm.	• "Wait" is displayed during the synchronization • After synchronization "Sync executed" is displayed briefly and then menu Copy all from MAS to PM. • The pump memory now contains the latest operation data.

Trouble Shooting

Overview

Table of Contents

This chapter contains the following topics:

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Event Messages and Actions 146

Common Problems and Solutions

Can Not Log In

This table shows the indication of and solution for problems with logging in:

Indication	Solution
Can not log in	• Check user name and password. The user name must be used with the proper password. The default password for config is ef56, for operator cd34. • It the default passwords are changed, make sure you have the new password. • Passwords are case sensitive. • If you lose your password, contact your local Flygt organization.

Can Not Connect to the Web Tool

This table shows the indication of and solution for problems with connecting to the web tool:

Indication	Solution
Not possible to connect to the web tool	• Follow the instructions in section *Connect to the Web Tool* in chapter *Installation*. • Check the IP address, and change it if necessary, using the operator panel. See *Check and Change the IP Address* in chapter *Settings with the Operator Panel*. • If the IP address has been changed, restart the base unit by briefly disconnecting the power supply.

Can Not View Graphs

This table shows the indication of and solution for problems with viewing graphs:

Indication	Solution
• Can not view graphs • Can not view Java applets	Install Java: • Go to www.java.com. • Download Java Runtime Environment (free) and install it.

Wrong Display Language

This table shows the indication of and solution for wrong display language:

Indication	Solution
The wrong language is displayed	Change the display language using the • operator panel. See *Change the Display Language* in chapter *Settings with the Operator Panel*. • web tool. See *Change the Display Language* in chapter *Settings with the Web Tool*.

Problems Communicating with another Unit

This table shows the indication of and solution for problems communicating with another unit (Pump memory, Operator panel, Relay module, Power analyzer, PLC):

Indication	Solution
• Communication alarm (displayed in the Active alarms list and Alarm and event log) • No pump memory sync (displayed in the Active alarms list and Alarm and event log) • Operator panel menus are not updated when pressing panel buttons • No values from the Power analyzer • Alarms not correctly indicated on the Relay Module	• Make sure the wires are connected correctly, according to the instruction in section *Connect the unit* in chapter *Installation*. • If the communication with the PLC is not working on Ext 1, try to switch the A/B-wires on terminal number 41/42 (the A/B- might vary between different types of PLCs)

Sensor Problems/ Incorrect Sensor Values

This table shows the indication of and solution for sensor problems:

Indication	Solution
• Broken circuit, Short circuit (displayed in the Active alarms list and Alarm and event log) even though the sensor is connected *or* • Evidently incorrect values from for example Pt100	• If the wires for the Pt100-sensor are very long, compensate for this according to the instruction in section *Compensate for Measurement Error due to Long Leads* in chapter *Settings with the Web Tool*. • Check that the wires are connected correctly: – Correct wire from the sensor cable… – to the correct terminal number in the cabinet connection block *and* – to the correct terminal number in the base unit terminal block. • Check that the sensor is working by disconnecting the wires and measuring or by contacting your local Flygt organization. • If the sensor will get its power supply from the MAS, measure the power supply. • Change the sensor

No Registration of Running Time/Number of Starts

This table shows the indication and solution when there is no registration of running time/number of starts:

Indication	Solution
No registration of running time/number of starts	Make sure the function is activated according to the instruction in section *Record Running Time and Number of Starts* in chapter *Settings with the Web Tool*.

Event Messages and Actions

Introduction

Most alarms and events are self-explanatory. Pump related alarms should prompt an investigation to identify the cause of the alarm. To support the operator, pump related alarm items in the list are marked in light blue. This indicates a link to a plot function that shows measurements up to and around the time of the alarm. This helps the operator to analyze the sequence of events.

Event listing

This table shows where and how the events are listed:

The events are listed under ...	in the ...
View — Event log (1.1)	operator panel menu system.
View — Alarm and event log	web tool.

Event explanation and actions

This table shows events that may need explanation and their suggested actions:

No.	Event	Cause	Action
0	**ACKNOWL-EDGED**	Reset button (Operator panel) or Acknowledge button (web tool) pressed	No action
1	Reset	Power off (active), Power on (not active)	No action
2	Watchdog reset	Software failure. Restart initiated by software because of internal error.	If the message recurs, contact your local Flygt organization.
3	FLASH csum/mr error	Error in database memory	If the message recurs, contact your local Flygt organization.
4	EEPROM csum error	Error in configuration memory	If the message recurs, contact your local Flygt organization.
5	EEPROM init	Configuration memory initialized because of new program upload or on command.	No action
6	RAM corrupt error	Memory failure	If the message recurs, contact your local Flygt organization.
7	Ethernet error	Ethernet circuit failure	If the message recurs, contact your local Flygt organization.
8	Program error	Invalid program state discovered	If the message recurs, contact your local Flygt organization.

No.	Event	Cause	Action
9	Clock error	Clock circuit failure, lost backup voltage	Set clock
10	File upload error	Attempt to install program or upload database failed	Attempt to upload again
11	New program	New program installed	No action
12	E-mail error	Error in E-mail settings	Check E-mail settings
13	E-mail test	Test email sent	No action
14	Pump mem. com error	Pump memory communication error	Check • wiring • communication LEDs • setting Active/Inactive under General config – RS485/Modbus • for possible interference. **Reference**: See also *Problems Communicating with another Unit* (Pump memory, Operator panel, Relay module, Power analyzer, PLC) in section *Common Problems and Solutions*.
15	Pump mem. csum error	Pump memory error	If the message recurs, contact your local Flygt organization.
16	No pump memory sync	Pump serial number in Base unit and Pump memory differ	Synchronize Pump memory and MAS manually. **Reference**: See section *Copy Data To/From Pump Memory* in chapter *Operation*.
17	Power an. com error	Power analyzer communication error	See Pump mem. com error (no. 14) above
18	Reserved, not in use		
19	Reserved, not in use		
20	Op-panel com error	Operator panel communication error	See Pump mem. com error (no. 14) above
21	Service request	Service is requested according to the user's own setting	Reset MAS and perform service of the pump
22	Database erased	Database erased on command	No action
23	Relay mod. com error	Relay Module, MRM 01, communication error	See Pump mem. com error (no. 14) above

Contact Information

Supplier

Supplier of this product is:

ITT Flygt

PO Box 2058

291 02 Kristianstad

Sweden

Phone: +46 (0)44 20 59 00

Distributor

The distributor for our products in your area is found at www.flygt.com.

Customer Support

To get in contact with the Flygt customer support please

- call +46 (0)44 20 59 59
- fax +46 (0)44 20 59 01

www.flygt.com

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